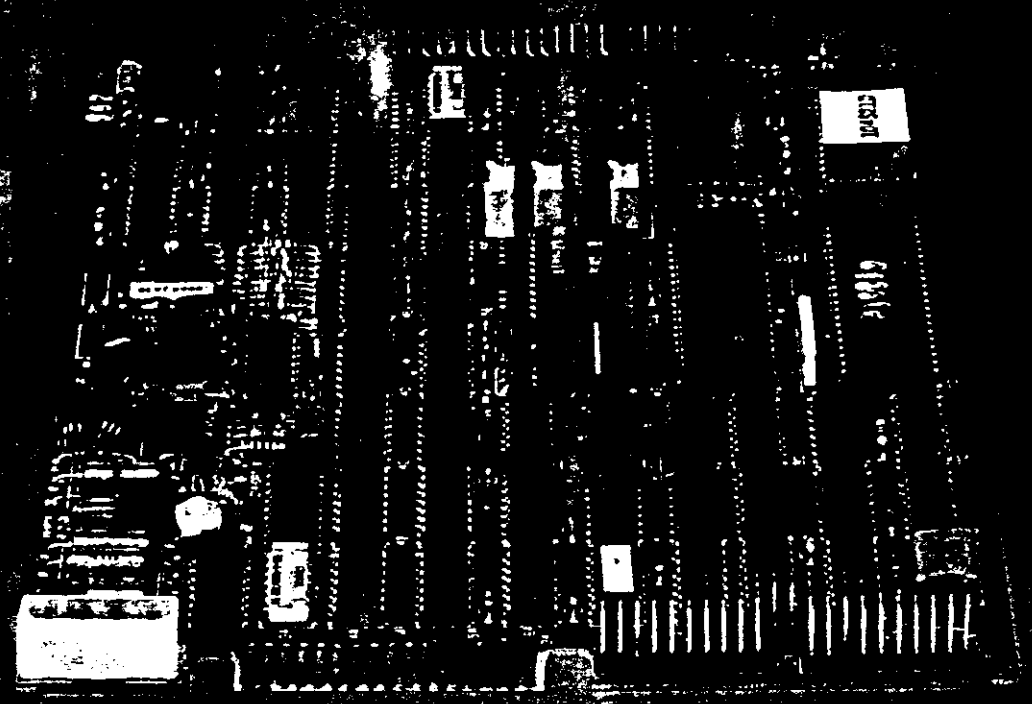
XEBEC S1410 . . . THE DEFINITIVE LOW-COST CONTROLLER FOR 5¼ INCH WINCHESTER DISK DRIVES



GENERAL DESCRIPTION

The unique Xebec S1410 5¼" Seagate compatible disk drive controller provides a compact, cost-effective, field-proven microprocessor-based controller to operate up to two drives. The S1410 controller is from the new Xebec, now a Micro-computer Systems Corporation Company. MSC is the largest independent manufacturer of disk drive controllers.

FEATURES

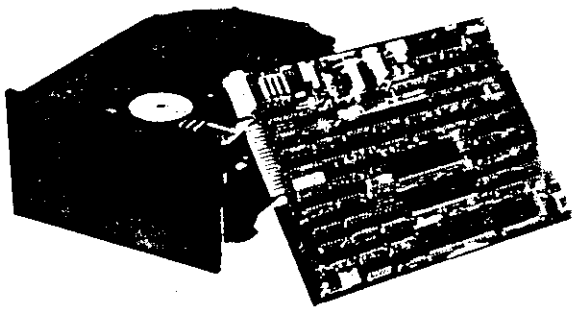
- Industry standard Host Interface (SASI)
- User programmable drive characteristics
- Automatic error correction
- Burst error length status reporting
- Controls two drives
- Compact PCB design
- Exactly fits the form factor of 5¼" drives
- Extremely low power requirements
- Multi-sourced gate array technology
- Complete on-board data separator logic
- Patent pending architecture
- Extensive controller and drive diagnostics

XEBEC
AN MSC COMPANY

XEBEC S1410 INTELLIGENT DISK CONTROLLER

The Xebec S1410 intelligent disk controller interfaces the Seagate ST506 5¼ inch and other compatible Winchester disk drives. Standard capabilities and features include:

- **Automatic Seek and Verify** — On all disk access commands, the SI410 automatically initiates a seek and ensures the heads are positioned over the correct cylinder. This ensures data integrity — even if there is a system malfunction.
- **Automatic Fault Detection** — The controller automatically flags controller and disk faults to improve error handling and simplify system troubleshooting.
- **Automatic Data Error Detection and Correction** — Using proven 32-bit polynomial error detection and correction code (ECC), the SI410 permits up to 22-bit burst error detection and up to 11-bit burst error correction for improved data integrity and system throughput. Burst error length data is passed to Host upon request.
- **Fast Step Mode** — User programmable to allow use of drive fast step option for reduced seek time.
- **Multi-Sector Transfers** — The SI410 has been specifically designed to handle multi-sector data transfers optimally. If end of track is reached during a multi-sector data transfer, the SI410 automatically initiates a head or cylinder switch to the next track.
- **Logical-to-Physical Drive Correlation** — Logical unit numbers (LUNs) are independent of physical port numbers to eliminate human error in cabling the system.
- **Selectable Sector Size** — Sector size is hardware strappable for either 256 or 512 bytes.
- **On-Board Sector Buffer** — A full sector buffer eliminates the possibility of data overruns/underruns during a transfer.
- **Industry Standard Host Interface Protocol** — The Shugart Associates System Interconnect (SASI) bus, combined with a high level command set, provides a highly efficient command and data communications path.
- **Programmable Sector Interleave** — Sector interleaving is software programmable to enable optimization of I/O between the host and disk drives.
- **Multi-Sourced Gate Array Technology** — Multi-sourced gate array technology dramatically reduces the number of components while increasing reliability.
- **Programmable Drive Characteristics** — For increased drive capacity without controller modification, host software can configure the number of cylinders (up to 2^{16}) and heads (up to 8).
- **Field Proven Software Protocol** — Using a high-level command descriptor block, the S1410 reduces overhead and I/O traffic to the disk system.



SPECIFICATIONS

GENERAL

Controls two drives.
Maximum host bus transfer rate 1 Mbyte/sec.
Drive transfer rate 625 Kbytes (5.0 Mbits/sec.)

HOST INTERFACE

Shugart Associates System Interconnect (SASI)

DRIVES INTERFACED

ST-506 Seagate Technology
TI-506 Texas Instruments
TM 600 Series Tandon
RMS 500 Series Rotating Memory Systems
CM 5000 Series Computer Memories, Inc.

HOSTS INTERFACED

The Xebec S1410 interfaces all popular Host adaptors.

ENVIRONMENTAL

Temperature:	0°C to +55°C
Humidity:	Operating 10% to 90% without condensation
Altitude:	Operating up to 10,000 feet
Dimensions:	5¾" × 8" × .69" (14.6 × 20.3 × 1.75 cm)
Power Requirements:	+5V @ 2.0A +12V @ 50mA

XEBEC
AN MSC COMPANY
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Sunnyvale, CA 94086
(408) 735-1340
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INSTALLATION AND OPERATION MANUAL
P/N 100654

XEBEC
HARD DISK KIT FOR
APPLE II COMPUTERS

5/12/82-XE67-49

This manual contains three chapters and an Appendix. Chapter I, entitled Assembly and Installation, takes you step-by-step through the procedures for assembling and installing the XEBEC Kit into your Apple II computer system; from checklist to turn on. Chapter 2, entitled Operation with CP/M tells you, in simple easy-to-follow steps, how to "boot" the system, verify proper operation, and (if needed) format the XEBEC Kit disk using CP/M. Chapter 3, entitled Operation With DOS tells you, in simple easy to follow steps, how to "boot" the system, verify proper operation, and (if needed) format the XEBEC Kit disk using Apple DOS. The Appendix contains useful reference material such as specifications for the XEBEC Kit, definitions of error codes, what to do if you have trouble, and a warranty.

XEBEC reserves the right to change any specifications or design of the XEBEC Kit to improve the product without prior notice.

The name Apple is a registered trademark of APPLE COMPUTER, INC.
The name CP/M is a registered trademark of DIGITAL RESEARCH, INC.
The name SoftCard is a registered trademark of MICROSOFT.
XEBEC is a subsidiary of MICROCOMPUTER SYSTEMS CORPORATION.

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PREFACE

IMPORTANT

Read this Preface before continuing with the rest of the manual.

This manual has been written for those of you who already own, and know how to use, an Apple II computer. If you just purchased your Apple II at the same time as this XEBEC Kit Mass Storage Disk Drive, set this manual aside with your new XEBEC Kit until you have inspected, installed, and learned how to use the Apple II computer. Resist the temptation of trying to do everything at once. You'll have plenty of time to use, and thoroughly enjoy, your wise purchase of this XEBEC Kit after you have become familiar with the Apple computer.

If you already own an Apple II, and know how to use it, you're ready to install the XEBEC Kit Disk Drive and enjoy a whole new world of mass storage delight; so read on.

In this manual you will notice three pictorial symbols have been used to help you during installation and operation of the XEBEC Kit Disk Drive System. Follow the instructions given with these symbols and you will avoid any unnecessary delays or possible problems you might otherwise encounter. The symbols used are as follows:

UNPLUG AC POWER CORD

When you see this symbol, never proceed without first unplugging the AC power cord from the main power outlet.

STOP & LOOK

Avoid possible damage to your computer, Disk Drive System, or software by following the instruction given exactly as written.

TAKE NOTICE

Information that follows can be helpful. We took the time to write these notes to help you, so why not take the time to read them.

SOME WORDS TO THE WISE BEFORE STARTING

STOP & LOOK

Unlike your Apple II, the XEBEC Kit Mass Storage Disk Drive uses a mechanical drive with motors and moving parts and therefore, requires some care in handling. In addition, the data recording media is a magnetic material coated on flat disks. Because of the properties of these magnetic disk devices, certain precautions must be taken when locating the XEBEC Kit near your Apple II computer system. By following some simple rules, you can ensure a maximum useful life for your XEBEC Kit.

Remember these rules:

1. Do not jar, drop, or shock the XEBEC Kit components. Mistreating the XEBEC Kit components is not a friendly thing to do, and the XEBEC Kit won't like it a bit.

2. Never place the XEBEC Kit Assembly closer than one foot from a strong magnetic field (as can be found near a TV set, your DISPLAY, or large electric motors). Strong magnetic fields can cause data stored on the disks to be lost, and, if the magnetic field is strong enough, can cause permanent damage to the XEBEC Kit.

CHAPTER I
ASSEMBLY AND INSTALLATION

INTRODUCTION

By the time you have reached this page in the manual we know (or at least assume) a few things about you.

1. You own an Apple II computer system.
2. You have just purchased (or have been given) a XEBEC Kit Mass Storage Disk Drive System.
3. You have unpacked the carton in which the XEBEC Kit was shipped.
4. You are anxious to assemble and install the XEBEC Kit and start using it.

Be patient. By carefully following the step-by-step procedures in this manual, you will have your XEBEC Kit up and running quickly and without any problems.

CHECKING WHAT YOU GOT

The first thing you should do is check to see that you have removed everything from the carton that you will need to bring your XEBEC Kit up and running.

Look at Figure I and compare it with what you removed from the carton. If you ordered all accessories you should have the following:

1. Power supply with AC power cord.
2. 34 pin daisy disk cable
3. 20 pin radial disk cable
4. 50 pin ribbon controller cable
5. Apple II Personality Interface Card
6. S1410 Hard Disk Controller
7. 5¼" Hard Disk Drive
8. Two mounting brackets
9. Mounting hardware:
   Four standoffs

Four split lock washers
Four Teflon washers
Twelve Phillips screws

10. System housing
11. Software diskettes
12. This manual (XEBEC Kit Installation and Operation Manual)

TOOLS YOU WILL NEED

Phillips Screwdriver

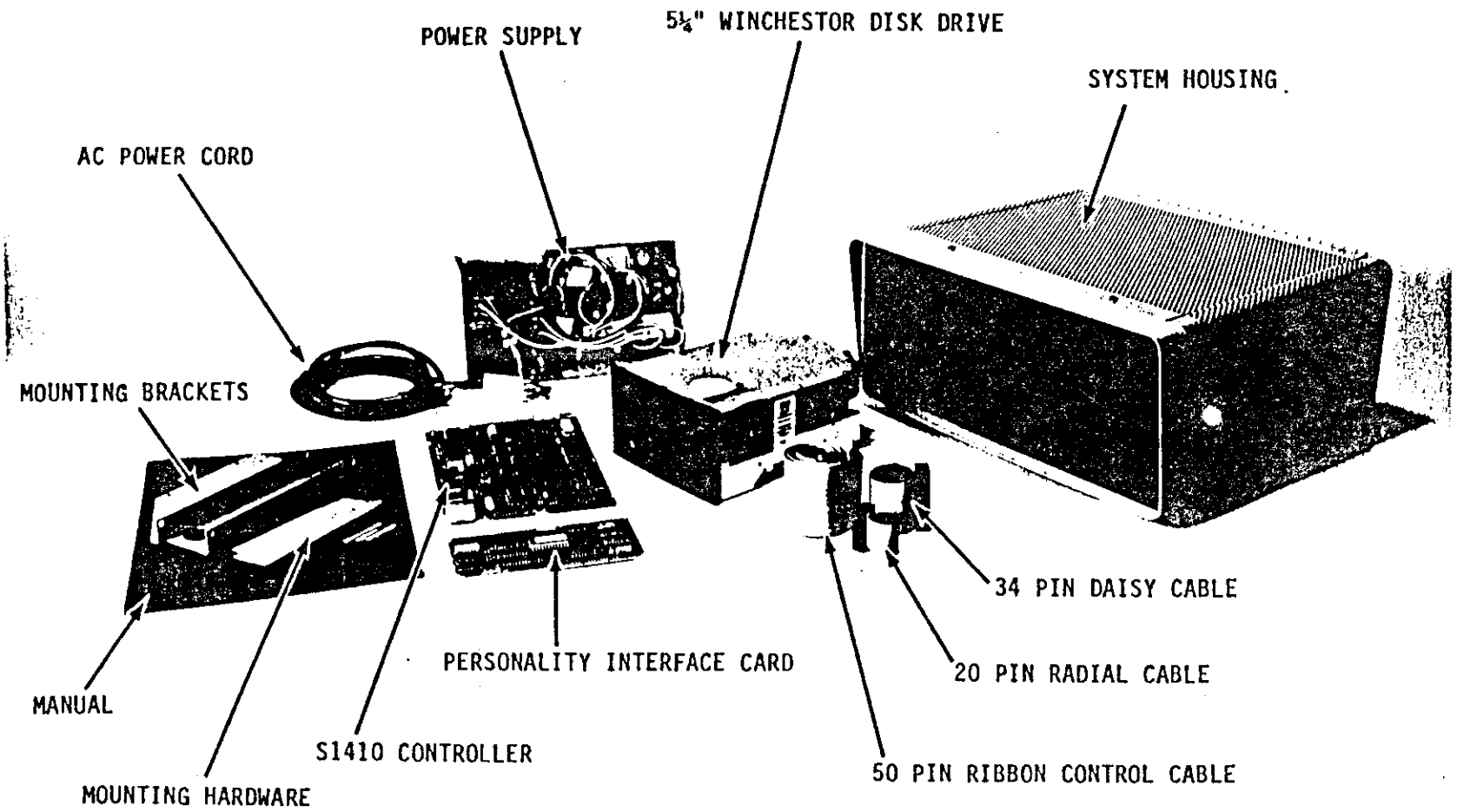


FIGURE 1. XEBEC KIT CARTON CONTENTS

If any of these items are missing and you ordered them, start digging in that carton right now. We were very careful to be sure that all those items were in the carton when it left the factory. If you still can't find one of the items, don't bother going any further at this time, but instead, contact Xebec.

CHECK FOR DAMAGE

The XEBEC Kit was carefully inspected, both electrically and mechanically, to ensure that the components operated properly and that there was no damage before shipment. Look at everything you unpacked to be certain that there was no damage in shipment (e.g., the XEBEC Kit housing is not dented, the cable connectors are not cracked or damaged, the floppy diskettes are not bent, the Printed Circuit Cards have no visible damage etc.). If any damage is noted, or suspected, notify Xebec immediately and do not attempt to install the XEBEC Kit into your Apple II system.

TAKE NOTICE

As we stated earlier, in the Preface, you should know how to run your Apple II computer before attempting to use the XEBEC Kit. If you couldn't resist getting into this manual before you have learned how to use your Apple II, that's OK. At least now you know you have everything shipped in the carton with the XEBEC Kit you will need later and that it is not physically damaged. But please, stop here and learn all about your Apple II before continuing with this manual. You'll be glad you took the time now, rather than trying to learn both systems at the same time. Then, when you've learned about your Apple II, come back.

MOUNTING THE CONTROLLER TO THE DISK DRIVE

It is easy for you to assemble the XEBEC Kit Disk Drive. Just use this procedure, make sure you follow each step exactly as written, and observe all cautions. This will ensure you of proper operation of your system later on.

You are now ready to proceed with the assembly of your XEBEC Kit Disk Drive. Look at Figure 2. You should have all these components for your Disk Drive assembly. When you have gathered them, do the following:

1. Mount two standoffs to each mounting bracket using four of the smaller screws (4-40), Figure 3.

2. Select either a right-hand or left-hand side mounting bracket and match it to the corresponding side of the Drive, Figure 3.

3. Align the lower two bracket screw holes with the holes in the Drive; install a split-lock washer and a large Phillips screw in both holes and, using your screwdriver, snugly screw into place.

4. Fit the remaining mounting bracket to the opposite side of the Drive and screw into place the same way as above.

5. Place the S1410 Hard Disk Controller over the four standoffs and align the four screw holes, Figure 4.

6. Install a Teflon washer and Phillips screw at each screw hole and, using your screwdriver, screw snugly into place.

Your Disk Drive assembly is complete. Take a few moments to double check that you've properly installed all the washers and screws and that the connections are snug. You are now ready to connect the Controller to the Disk Drive.

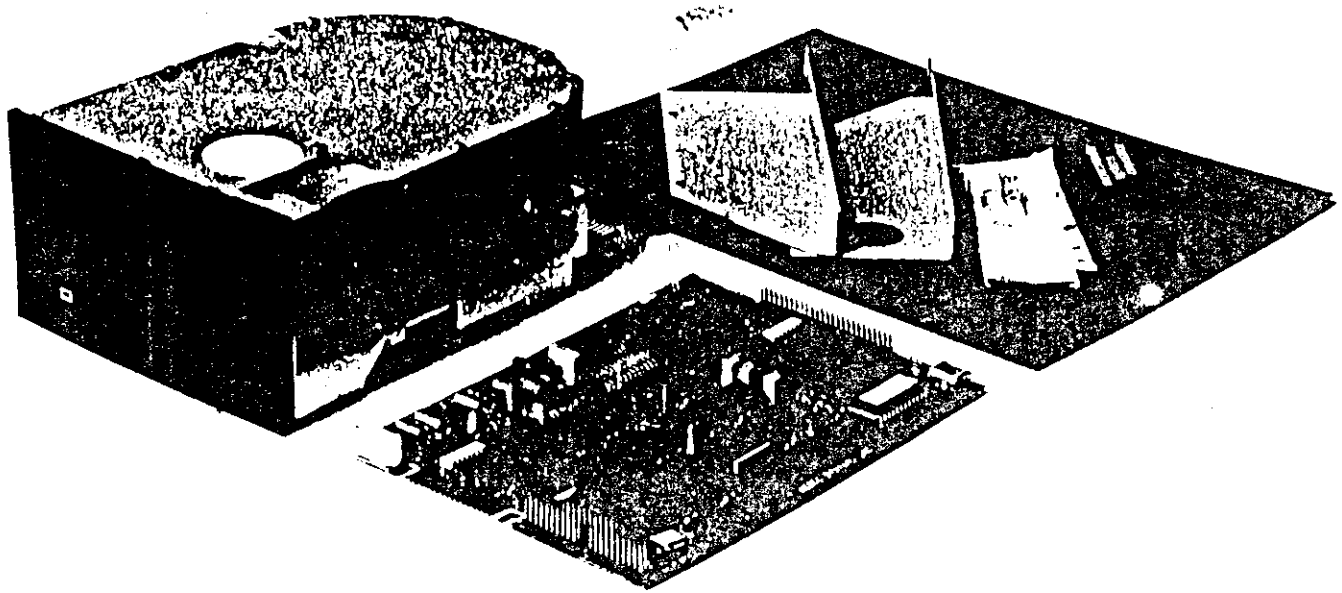


FIGURE 2. DISK DRIVE ASSEMBLY COMPONENTS

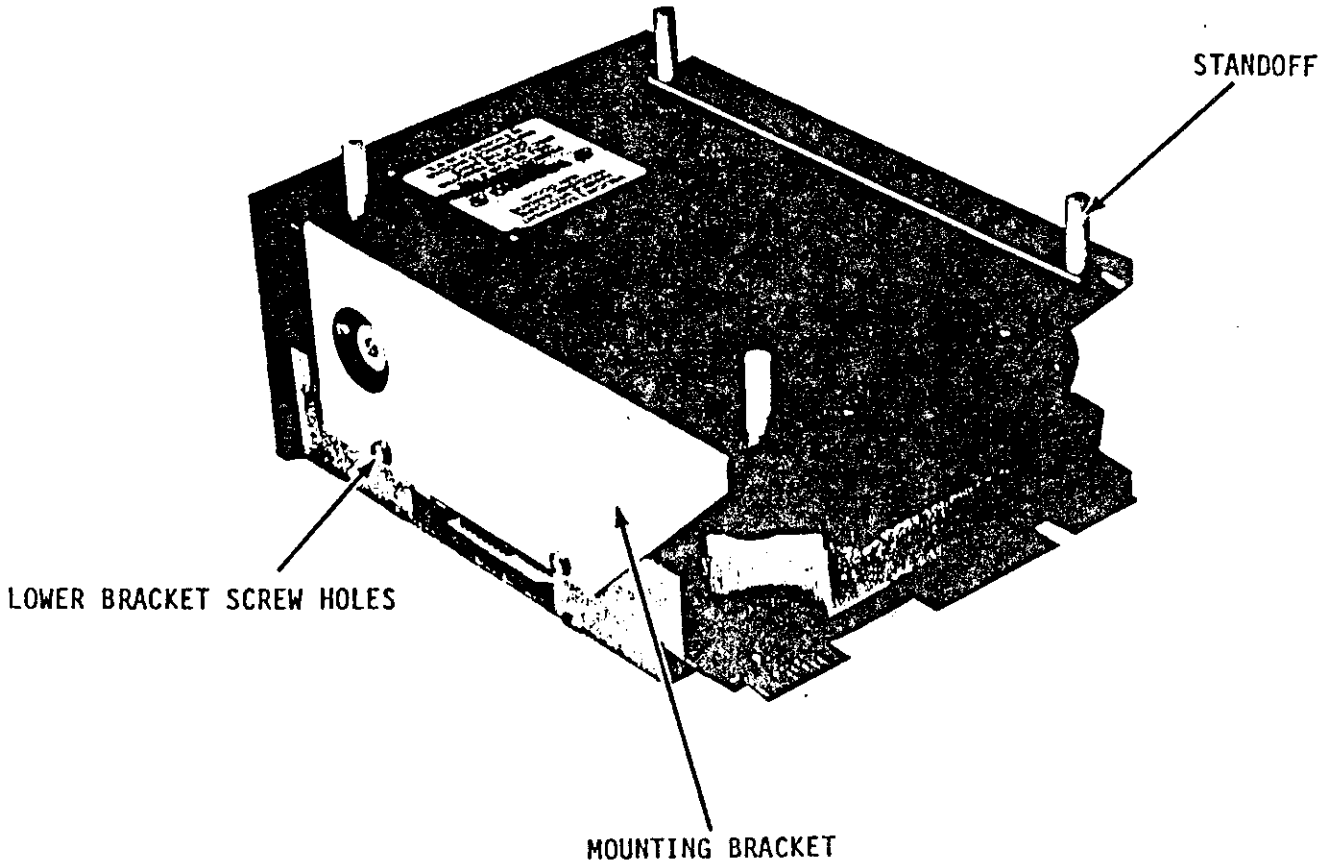


FIGURE 3. MOUNTING THE BRACKETS

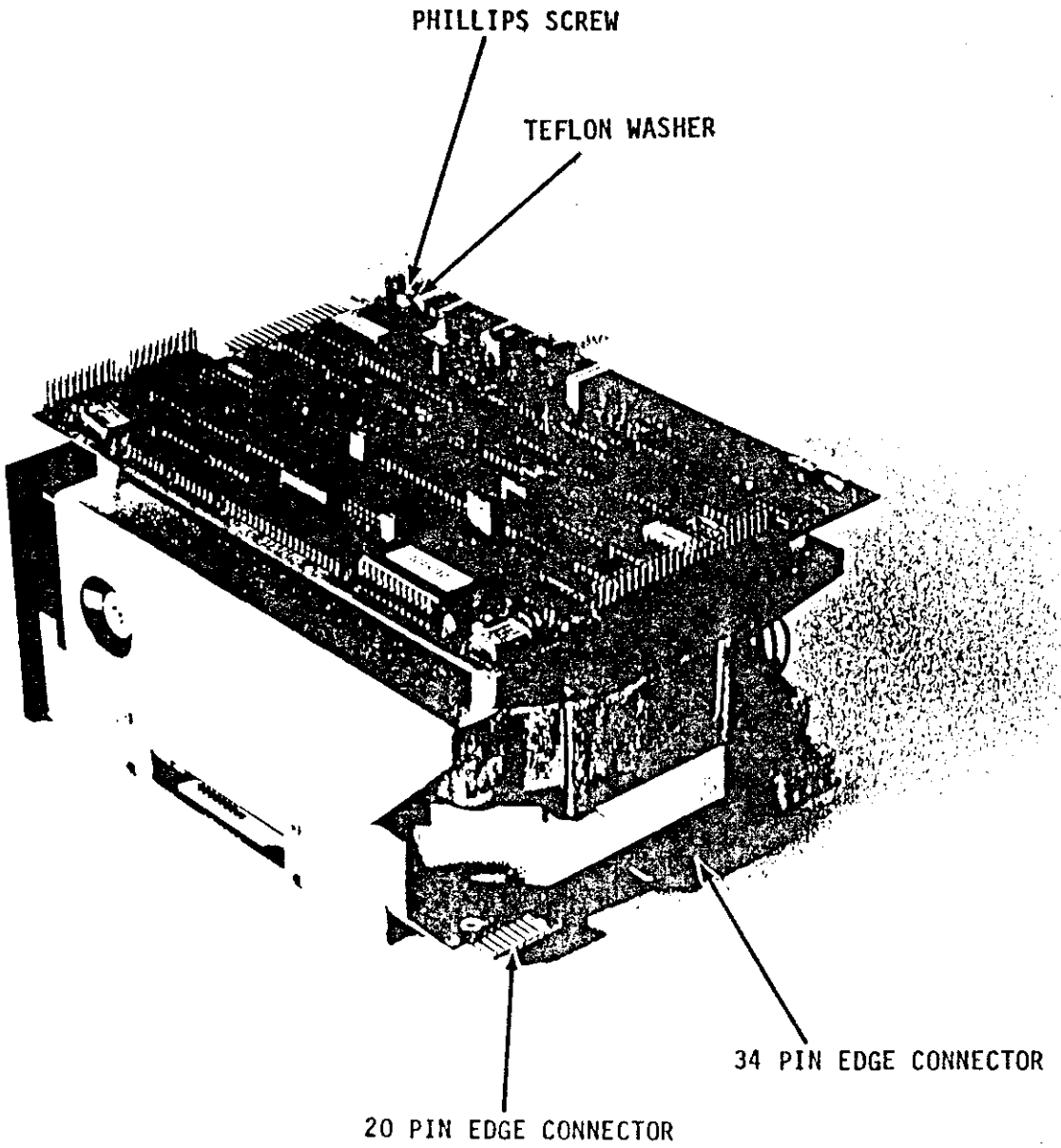


FIGURE 4. CONNECTING THE CONTROLLER TO THE DISK DRIVE

CONNECTING THE CONTROLLER TO THE DRIVE

To connect the XEBEC Kit Controller to the Disk Drive, you will need the 20 pin radial disk cable and the 34 pin daisy disk cable. If you are in doubt as to which cable is which hold the two cables together, the 34 pin cable is wider. Look at Figure 5. That's the way the Disk Drive will look after the cables are installed. To connect them properly, do the following:

1. To connect the 34 pin connector, slide the plastic connector over its corresponding edge connector, Figure 4.

STOP & LOOK

Be very careful not to install the cable backwards! Study Figure 5 and make sure to match pin 1 on the cable connector to pin 1 on the edge connector. Pin 1 locations should be marked but if you are in doubt, the plastic connector is marked with a △ to show pin 1.

2. To connect the 20 pin connector, slide the plastic connector over its corresponding edge connector, Figure 5.

3. Carefully feed the cables between the controller and the drive as shown in Figure 5.

4. Connect the remaining free end of the 34 pin connector to its corresponding edge connector. See Figure 5. Make sure to match pin 1 of the cable connector to pin 1 on the edge connector.

5. Connect the remaining free end of the 20 pin connector to the 20 pin terminal on the S1410 disk Controller. The pin terminals are labeled J2 and J3. You can use either terminal, but be sure you match pin 1 of the cable connector to pin 1 on the pin terminal. Pin 1 on this kind of terminal is square instead of round, to set it apart from the other pins.

6. When properly connected the red stripes on each cable face each other as shown in Figure 5.

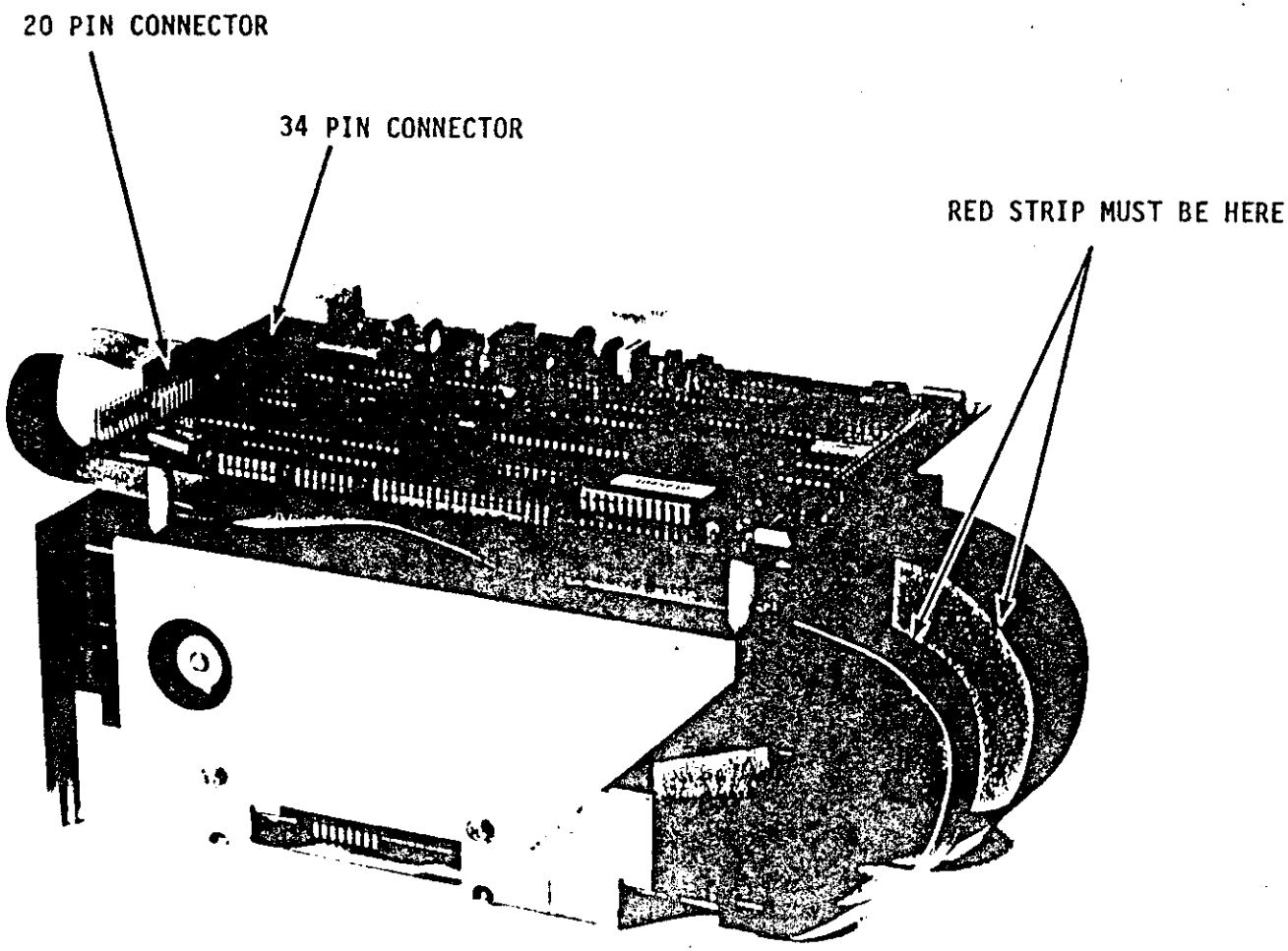


FIGURE 5. CONNECTING THE CABLES

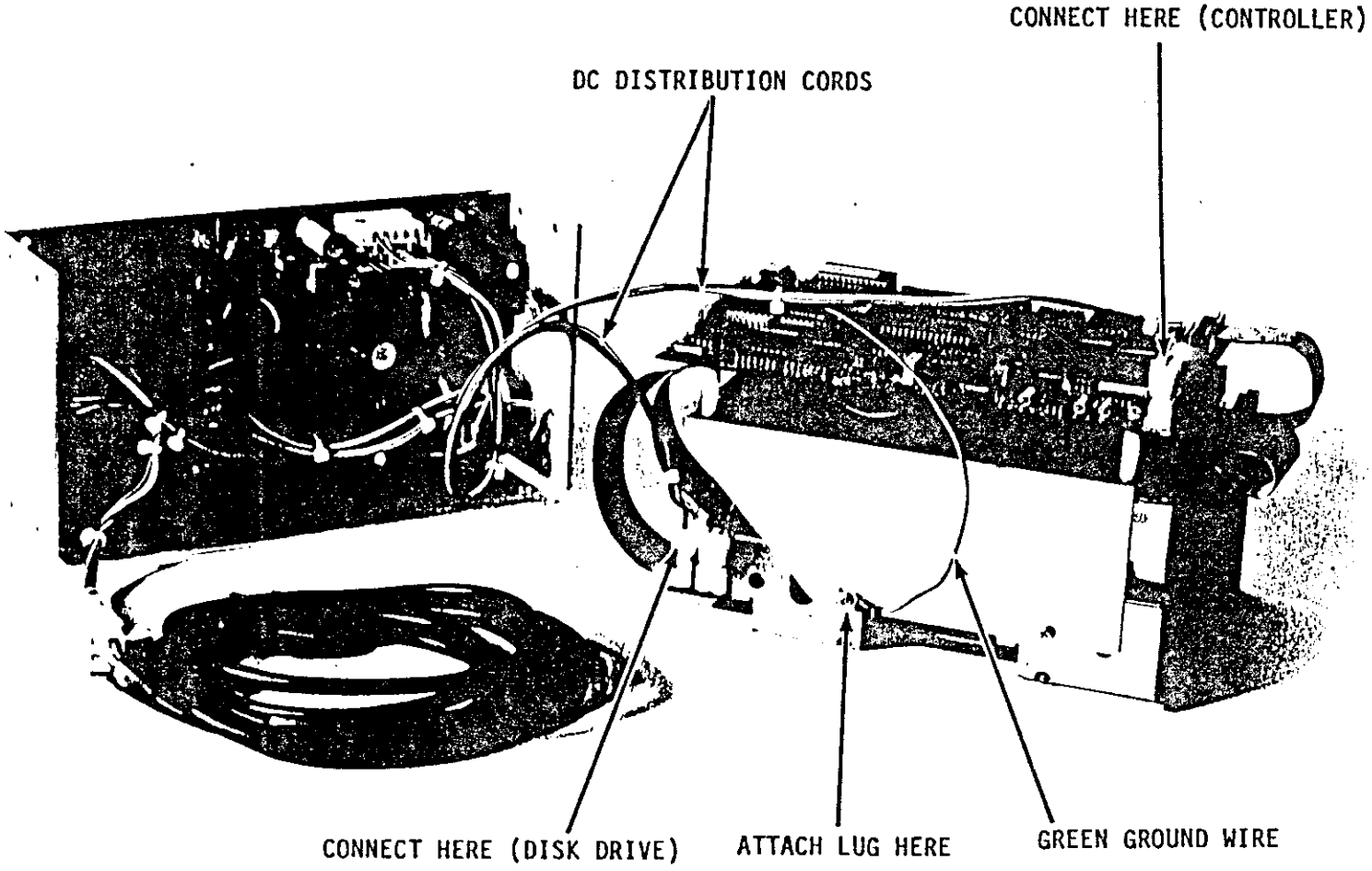


FIGURE 6. CONNECTING THE DC DISTRIBUTION CABLES

STOP & LOOK

Do not use the pin terminal labeled MGF. TEST ONLY. This terminal is for factory test purposes only.

CONNECTING THE POWER SUPPLY TO THE DISK DRIVE

Now that you have assembled your XEBEC Kit Disk Drive, you are ready to connect it to the power supply. It's easy, just refer to Figure 6 and do the following:

1. Position your power supply behind the Disk Drive, see Figure 6.

2. There are two DC distribution wires with female connectors that are connected to the power supply. One of them will include a green wire (ground wire). Plug this cord to its corresponding male connector on the Disk Drive, Figure 6.

3. Using your Phillips screwdriver, attach the ground wire lug to the Disk Drive as shown in Figure 6.

4. Plug the other DC distribution cord to its corresponding male connector located on the Controller as shown in Figure 6. Do not plug the AC cord into your AC outlet yet. You will do this later.

Congratulations! You've completely assembled your XEBEC Kit Disk Drive! You can now go on to the next section to connect your XEBEC Kit to your Apple II.

TAKE NOTICE

If you are not mounting the Power Supply in the Optional Cabinet available from XEBEC use caution in operating the system without enclosing the power supply; insure that no one can access the high voltages inside the power supply.

CONNECTING THE XEBEC KIT TO YOUR APPLE

In order to connect the XEBEC Kit to your Apple II, it is necessary to remove the top cover of the Apple II to install the Apple Interface Card. By now, you have surely done this before. However, just as a reminder, look at Figure 7 and do the following:

UNPLUG AC POWER CORD

Be certain that the AC power cord is unplugged from the AC power outlet before continuing. You can, if you wish, simply place the AC power switch on the Apple II in the OFF position, but unplugging the AC power cord will ensure that AC power is not accidently turned on while installing or removing any circuit card in your Apple II.

1. With both hands, pry the back of the cover up from the Apple II case until the snaps that hold the cover in place disengage. You'll probably have to use a fair amount of force.

2. When the back of the cover snaps loose from the Apple II case, do not lift anymore, but simply pull the cover back from the front of the Apple II until the front lip of the cover is free from the case, then set the cover aside.

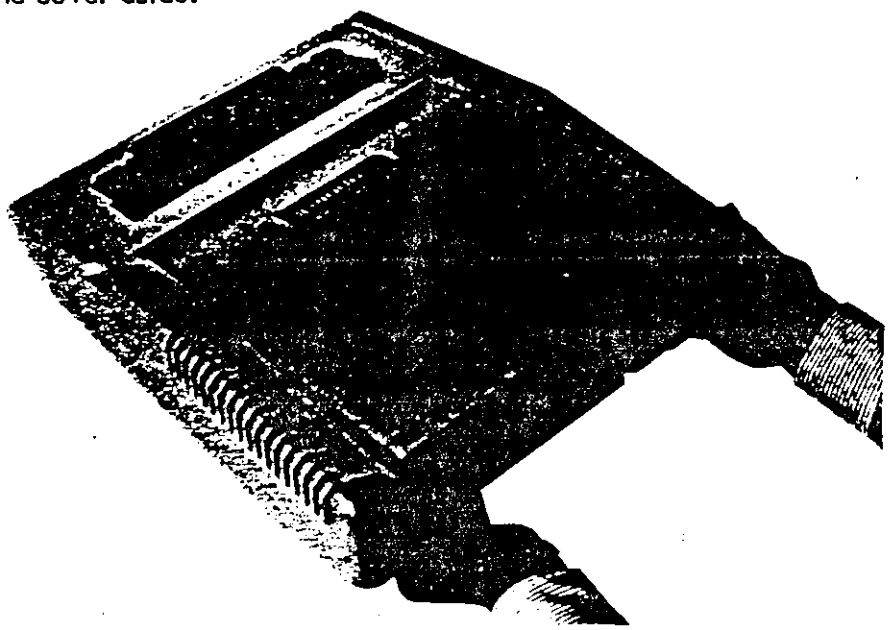


Figure 7. Removing the Apple II Cover

STOP & LOOK

Installing, or removing circuit cards from your Apple II while AC power is on will almost certainly severely damage the circuit card or the rest of your Apple II. Why take a chance?

Look inside your Apple II. You will notice a large circuit board with eight long narrow connectors located along the back end of the computer. These connectors are numbered 0 through 7, counting from left-to-right when you are facing the front of the Apple II. You will also notice some small circuit cards already installed in some of these connectors. The number of circuit cards installed in their locations will depend upon the configuration of your Apple II computer system. Table I gives you an idea of possible circuit cards already installed in your Apple II and their possible locations.

Table I. Apple II Circuit Cards

If Your Apple Has	Possible Card Locations
One or Two Floppy Diskette Drives	6
Three or Four Floppy Diskette Drives	6 and 5
Five or Six Floppy Diskette Drives	6, 5 and 4
Microsoft SoftCard with CP/M Operating System	4 or 7
16K RAM Card (Language Card)	0
Serial Data Interface(s)	1, 2 and/or 3
Other Peripheral Controller Cards	Any but 0

NOTE: Except for the Language Card which must be plugged into slot 0, all other cards can be plugged into any slot if proper addressing is considered. The card locations shown in this table are those suggested by Apple II and Microsoft manuals.

The XEBEC Kit Personality Interface Card is designed to plug into any one of the 7 available connectors (connector 0 is reserved for only a Language Card). However, the software supplied for CP/M that supports the XEBEC Kit assumes that the Personality Interface Card is plugged into slot 4. If another slot is used,

it will be necessary to slightly modify the software when first loaded from the supplied CP/M floppy diskette. Therefore, when used with CP/M, we recommend that you plan to use slot 4 in your Apple II for the XEBEC Apple Interface Card.

TAKE NOTICE

The XEBEC Kit software is designed to be used with up to four Disk II (or equivalent) floppy diskette drives. So, if you have five or six diskette drives and one of the Disk II Controller Cards is plugged into connector 4, you won't need that controller card for the fifth or sixth diskette drives anyway and you can use connector 4 for the XEBEC Kit Apple Interface Card.

UNPLUG AC POWER CORD

Just a friendly reminder.

To install the XEBEC Kit Personality Interface Card in your Apple II, do the following:

1. Remove and/or relocate any peripheral controller card presently plugged into slot 4 of the Apple II.

2. Look at the Apple Interface Card and the ribbon control cable supplied with the XEBEC Kit. You will notice that the ribbon cable has identical dual-in-line female connectors on each end. The female connector is designed to plug into the male pin connector located on the top edge of the Apple Interface Card. Notice also that the ribbon cable exits the female connector on one side.

STOP STOP & LOOK

The Apple Interface Card has an edge connector that protrudes from the bottom edge of the card (see Figure 8). There are "fingers", which are actually circuit board etchings on the top and bottom sides of this protruding edge connector. These "fingers" make electrical contact between the Apple II and this card when it is plugged into connector 4. Do not touch these "fingers" when handling the card because natural oils on your fingers will get on the card's "fingers" and may result in a poor electrical connection.

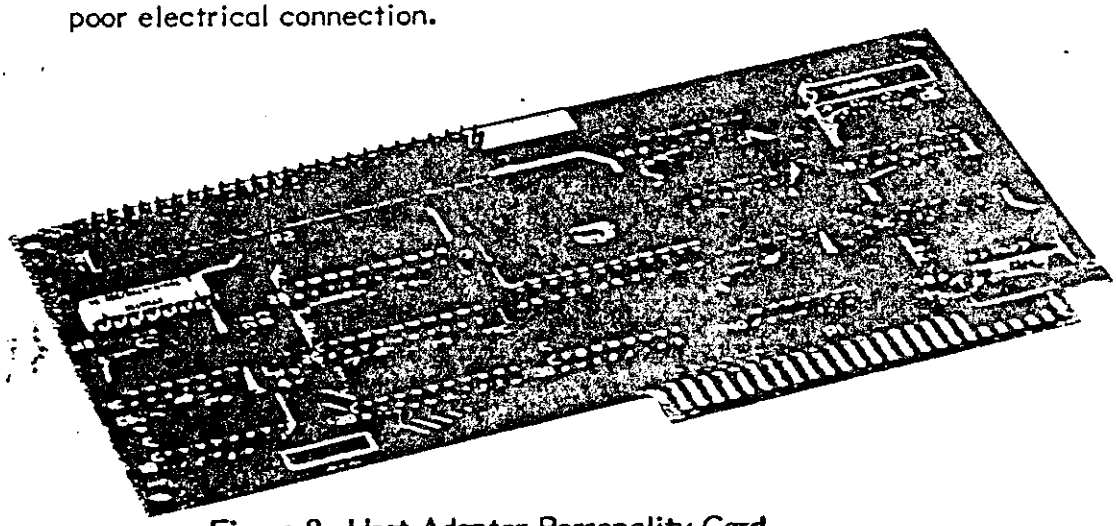


Figure 8. Host Adapter Personality Card

3. Position the ribbon cable female connector above the Personality Interface Card pin connector so that **pin 1** (marked on the side of the ribbon cable connector) **matches** up with **pin 1** printed on the Apple Interface Card. Be sure that the cable exits towards the bottom of the Apple Interface Card. If the cable does not exit towards the bottom of the Personality Interface Card, reconnect using the other end of the cable.

4. Making sure that all pins are aligned, mate the connectors.

5. Now pick up the Personality Interface Card (and the ribbon cable connected) with both hands holding the top edges of the card as shown in Figure 9.

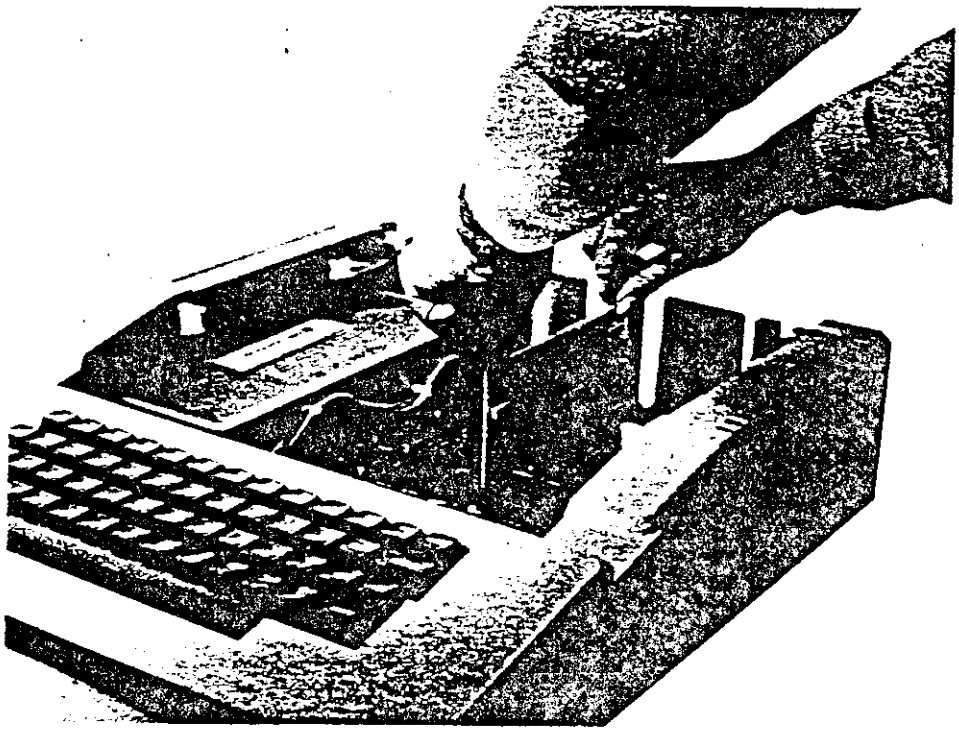


Figure 9. Plugging In the Apple Interface Card

6. Locate the Apple Interface Card in the Apple II so that the edge connector is directly over connector 4.

7. Insert the back end of the edge connector into connector 4 and "roll" the Personality Interface Card forward, while putting slight pressure downward on the card until the edge connector is fully seated in connector.

8. By bending the ribbon cable 90 degrees (you can make a moderate crease with your fingers), route the cable around the front of the Personality Interface Card and then back through the middle long slot in the back of the Apple II as shown in Figure 10.

9. Locate the XEBEC Kit Disk Drive assembly next to the Apple II so that the ribbon cable will reach the connector on the rear of the Disk Drive Kit. Plug the ribbon cable connector into the mating connector on the Disk Drive Controller, so that pin 1 and the red stripe on the cable corresponds with the designation P2 on the controller next to the connector.

10. Notice that the male connector, on the ribbon cable, is shaped so that it can only plug into the mating connector on the Disk Drive one way. Connect the ribbon cable to the Disk Drive and snap the two hold-down clips over the connector ends to secure it.

This completes the procedures for connecting the XEBEC Kit Disk Drive to your Apple II. Before replacing the cover on the Apple II, double check the following items:

1. Make certain that all cards plugged into connectors 0 through 7 are still **seated all the way** in their respective connectors.

2. Check that the ribbon cable connector is still securely plugged into the Personality Interface Card connector.

3. Carefully check that **pin 1 on the ribbon cable** female connector **matches up with pin 1 printed** onto the component side of the Personality Interface Card. Pin 1 on the Interface Card is also denoted by a **square pad on the solder side** of the printed circuit board.

4. When your Apple II ribbon cable connections look like our ribbon cable connection in Figure 10, you are done and can replace the Apple II cover.

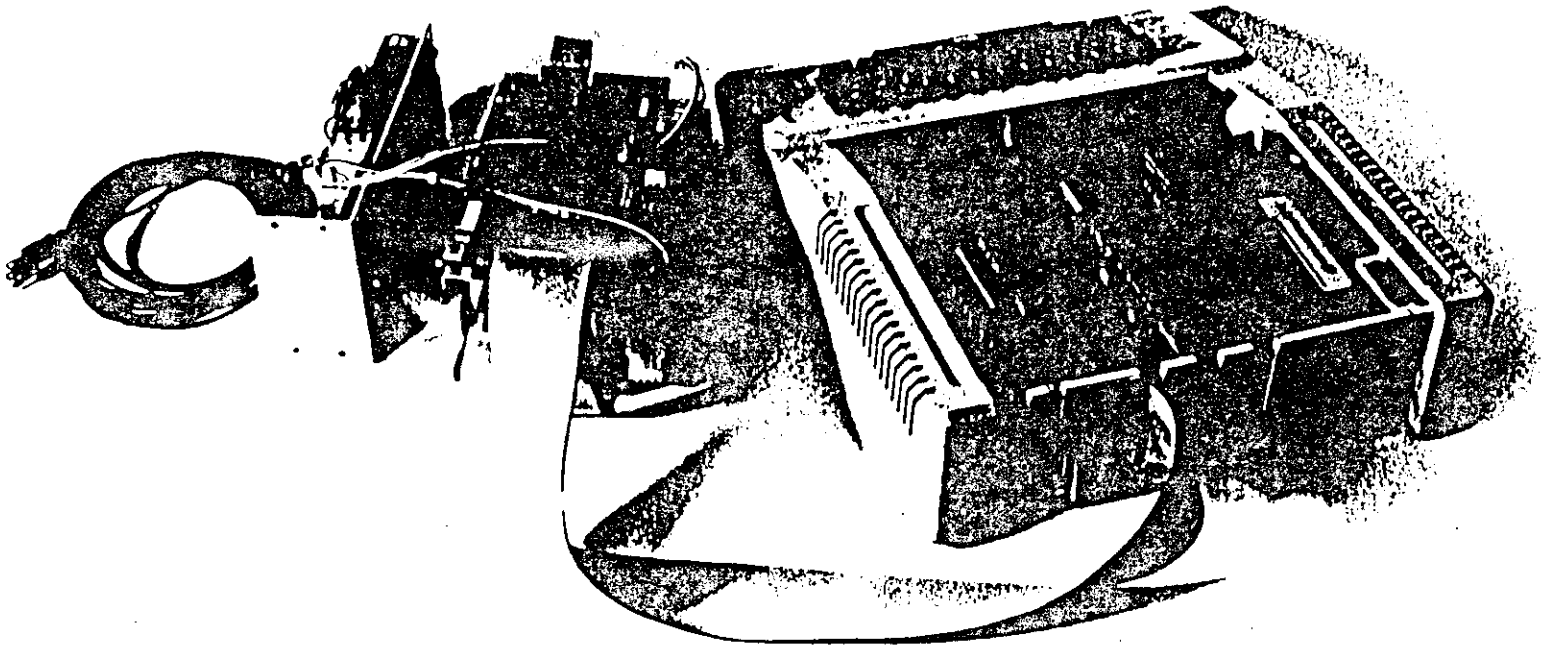


Figure 10. XEBEC Kit Connected to Apple II Correctly

TURNING ON THE SYSTEM

You are now ready to turn on the new XEBEC Kit Mass Storage Disk Drive and your Apple II computer system. To turn on the system, do the following:

1. Plug in the AC power cord at the rear of the XEBEC Kit assembly into an AC power outlet.

2. Plug the Apple II power cord into an AC power outlet.

3. Make certain your CRT display is plugged into an AC outlet and that the CRT is turned on.

4. Turn on the Apple II and observe a normal floppy-boot-sequence response on the CRT display as described in your Apple manuals.

This completes the installation portion of this manual. If you purchased the CP/M Operating System version, you are now ready to go to Chapter 2 where you will learn how to check out the XEBEC Kit Drive and format the hard disks using CP/M. If you purchased the DOS 3.3 Operating System version, you are ready to go to Chapter 3 where you will learn how to check out the XEBEC Kit Drive and format the hard disks using the Apple DOS.

CHAPTER 2
OPERATION WITH CP/M

WHAT YOU WILL NEED

In order to operate your XEBEC Kit System as a mass storage device for your Apple II, you must have the following as part of your computer system:

1. Apple II with 48K RAM and Language Card (56K Total Memory)

2. One Apple Disk II floppy disk drive and controller card. Two floppy disk drives are even friendlier, as you no doubt have already figured out when trying to copy diskettes.

3. Microsoft CP/M 2.20B SoftCard package with supporting diskettes.

4. XEBEC CP/M Utility diskette supplied with your XEBEC Kit System.

SOME THINGS YOU SHOULD KNOW

The XEBEC Kit System and its supporting software, have been designed to operate under certain system parameters. The folowing list identifies these parameters for your interest now and consideration later when you start using your XEBEC Kit System for data storage.

1. The software is designed for 16 sector formatted diskettes.

TAKE NOTICE

The Apple SoftCard Software Utilities Manual tells you how to access 13-sector diskettes from 16-sector formatted diskettes if you presently are using 13-sector diskettes in your floppy drive(s).

2. The XEBEC CP/M Utility Diskette suppplied with the XEBEC Kit System is **not Bootable.**

3. XEBEC CP/M software is designed to support only two Disk II floppy disk drives, addresssed as disk A and disk B. However, if you have four floppy disk drives, it is not necessary to remove the other two drives from the system. They will simply be ignored by the XEBEC Kit System software.

4. XEBEC CP/M Software will operate only in Slot 4.

5. The XEBEC disk is NOT bootable under CP/M.

BRINGING UP THE SYSTEM

Before turning on the Apple II and the XEBEC Kit System, check that you have installed the system as described in Chapter I of this manual; and specifically, that the XEBEC Personality Card is installed in Slot 4. When you are satisfied that your Apple II system is configured properly, do the following:

1. Locate the **Softcard 16-Sector DOS And Other Language** diskette copy (you should have made it earlier when setting up the Apple II for the first time) and **insert it into diskette drive A.** Close the door.

STOP & LOOK

If you didn't make a copy, and safely store away the MASTER 16-Sector DOS And Other Language SoftCard diskette as instructed in the Apple II manuals, don't go any further. Remove that diskette and refer to your Apple II manuals on how to copy diskettes. Make a copy now and store away the Master. Do not write protect this copy yet. From now on you should only use the copy SoftCard diskette.

2. Locate the XEBEC CP/M Utility diskette and set it aside. You will need it in a few minutes.

TAKE NOTICE

The instructions that follow are written for an Apple II system that has only one floppy diskette drive. If you have two floppy diskette drives, you can simplify these instructions by using both diskette drives and simply addressing (A or B) the drive you want to access for any particular step. If you are uncertain about using (and addressing) two diskette drives, you can either continue with these instructions using only one drive or refer to the SoftCard Software Utilities Manual to refresh your memory on how to use multiple drives.

3. Turn on the Apple II and CRT display. In a moment you will see the very familiar Apple prompt on the CRT telling you that Apple has booted:

   APPLE II CP/M
   xxK VER 2.20B
   (c) 1980 MICROSOFT

   followed by the prompt:

   A>

   The xx in the prompt will actually be the memory size of your Apple II. Note that 56K is required.

   Remove the SoftCard diskette from drive A and insert the XEBEC CP/M Utility diskette

TAKE NOTICE

FORMATTING THE XEBEC Kit System CP/M DISKS

Formatting destroys ANY and ALL data on the specified hard disks.

1. In order to format the hard disks on the XEBEC Kit System you must use the XEBEC Format Utility, MSFMT. To do this, remove the Bootable CP/M system diskette copy from drive A and insert the XEBEC CP/M Utility diskette.

2. When the XEBEC CP/M Utility diskette is inserted in drive A, type in MSFMT and check your entry on the CRT. The CRT will display:

   A> MSFMT

3. The format program header message will be displayed, followed by the prompt: HIT RETURN TO START FORMATTING.

4. Type RETURN. The formatting process will take about 9 minutes (The red light on the disk drive will be on continuously during this process).

5. While formatting is in process, Remove the utility diskette from drive A and reinsert the system diskette copy.

6. On format completion, FORMAT SUCCESSFUL will be displayed, followed by the system prompt:

   A>

INSTALL BASIC I/O SUBROUTINES

1. Remove the system diskette, reinsert the utility diskette, and type in APPLXFER.

2. Type RETURN. After the program has loaded, remove the utility diskette and reinsert the system diskette copy.

3. Read the display. After the minimum requirements prolog you are asked to select a disk partitioning scheme. Type the selected layout number (0-2).

4. APPLXFER will prompt for the diskette CP/M unit. Type A. Type Y to the Double-check prompt.

5. After DONE is displayed, remove the diskette, write-protect it and label it BOOTABLE XEBEC CP/M 2.21 MASTER.

TAKE NOTICE

At this point you should make a copy of this diskette so that you have a backup in case something happens to your working copy.

XEBEC CP/M STARTUP

1. Turn OFF the Apple II.

2. Insert Re XEBEC CP/M system diskette in drive A.

3. Turn on the Apple II. Re diskette will boot and display:

Apple II CP/M
56K Ver 2.21 MSC
(C) 1980 microsoft
A>

If this doesn't happen, something went wrong when you tried to create the Bootable XEBEC CP/M diskette. You'll have to go back to BRINGING UP THE SYSTEM and try again.

4. Type DIR C: and RETURN. The red light on the XEBEC Kit System will turn on, blink several times and turn off and the CRT will display:

NO FILE
A>

This indicates that CP/M can access the XEBEC drive correctly. You can now copy the system files from diskette (A) to XEBEC disk (C).

5. Type in PIP C:=A*.* Check your entry on the CRT and then type the RETURN key. The red light will blink as the XEBEC Kit System seeks data from the diskette drive A and copies the data onto the XEBEC Kit System CP/M disk. The CRT will display whatever was copied from diskette drive A to the hard disk.

6. Type C: when the A> prompt appears. This will change the system default drive to C.

7. Finally, type DIR to display the contents of the XEBEC disk.

YOU ARE DONE

To Boot re system from now on insert the XEBEC CP/M system diskette into drive A, turn on the Apple II and type C: In response to the A> prompt. You can then remove the system diskette from drive A and operate entirely from the XEBEC Kit.

CHAPTER 3
OPERATION WITH DOS

WHAT YOU WILL NEED

In order to operate your XEBEC Kit System as a mass storage device for your Apple II under control of Apple DOS, you must have the following as part of your computer system:

1. Apple II with 48K memory (56k is even better).

2. One Apple Disk II (or equivalent) floppy disk drive with controller card plugged into Apple card slot 6.

3. Apple DOS package and supporting diskettes (DOS 3.3 System Master and DOS 3.3 BASICS).

4. **XEBEC DOS Utility diskette** supplied with your XEBEC Kit System.

SOME THINGS YOU SHOULD KNOW

The XEBEC Kit, and its supporting software, have been designed to operate under certain system parameters. The following list identifies these parameters for your interest now and consideration later when you start using your XEBEC Kit for data storage.

1. The software is designed **only for 16 sector formatted diskettes.**

   TAKE NOTICE

   The Apple Software Utilities Manual tells you how to access 13-sector diskettes from 16-sector formatted diskettes if you presently are using 13-sector diskettes for your diskettes.

2. The XEBEC DOS Utility diskette supplied with the XEBEC Kit is **not "Bootable".** (More about this later.)

3. The XEBEC DOS Utilities makes no changes in the number of Disk II (or equivalent) floppy disk drives supported by Apple DOS.

BRINGING UP THE SYSTEM

Before turning on the XEBEC Hard Disk and Apple II, check that you have "installed" the system as described in Chapter I of this manual.

When you are satisfied that your Apple II system is configured properly, do the following:

1. Locate the **DOS 3.3 System Master diskette** copy (you should have made it earlier when setting up the Apple II for the first time) and **insert it into diskette drive 1.** Close the door.

   STOP & LOOK

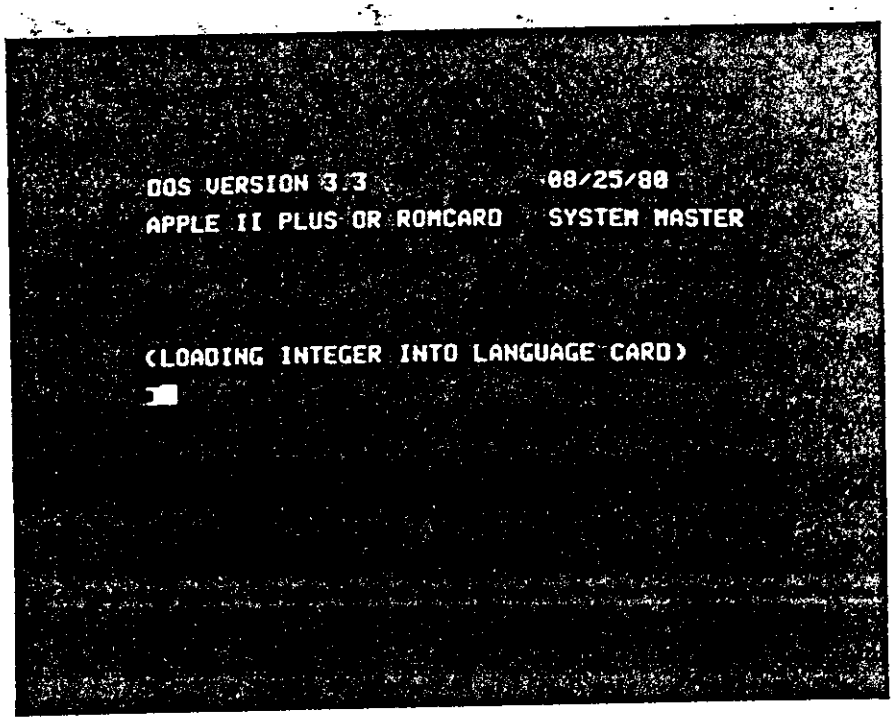
   If you didn't make a copy, and safely store away the original DOS 3.3 System Master diskette as instructed in the Apple II manuals, don't go any further. Remove that diskette and refer to your Apple II manuals on how to copy diskettes. Make a copy now and store away the original. From now on you should **only use the** copy **of the DOS 3.3 System Master diskette.**

2. Locate the XEBEC DOS Utility diskette and set it aside. You will need it in a few minutes.

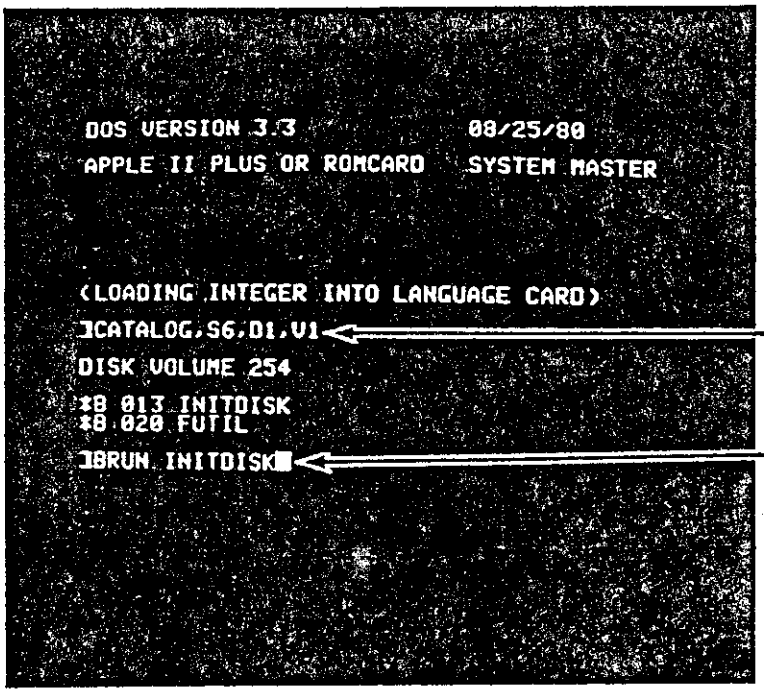
TAKE NOTICE

The instructions that follow are written for an Apple II system that has only one floppy drive. If you have two floppy diskette drives, you can simplify these instructions by using both diskette drives and simply addressing the drive (1 or 2) you want to access for any particular step. If you are uncertain about using (and addressing) two diskette drives, you can either continue with these instructions using only one drive or refer to the Software Utilities Manual to refresh your memory on how to use multiple drives.

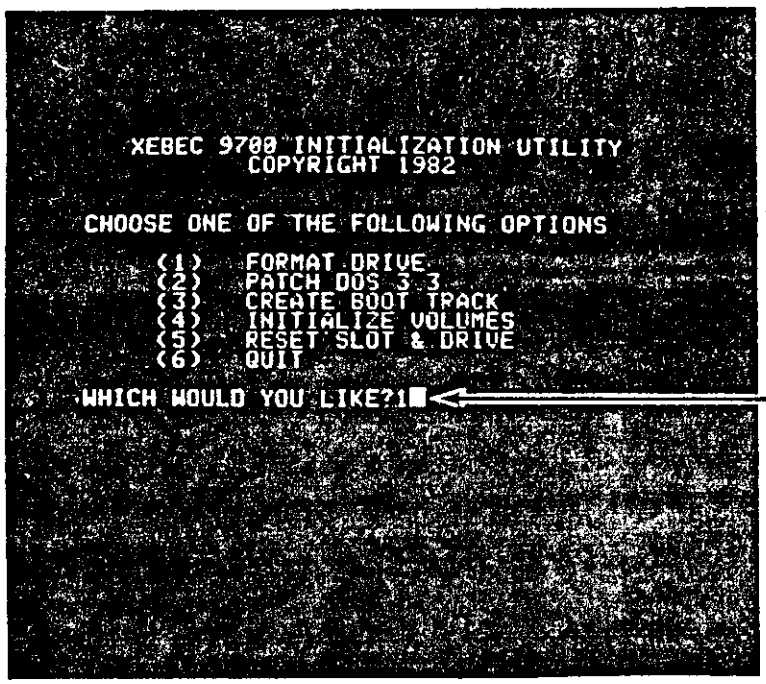
3. Turn on the XEBEC Kit System, Apple II, and CRT display. In a moment you will see the very familiar Apple prompt on the CRT telling you that the Apple II has booted:



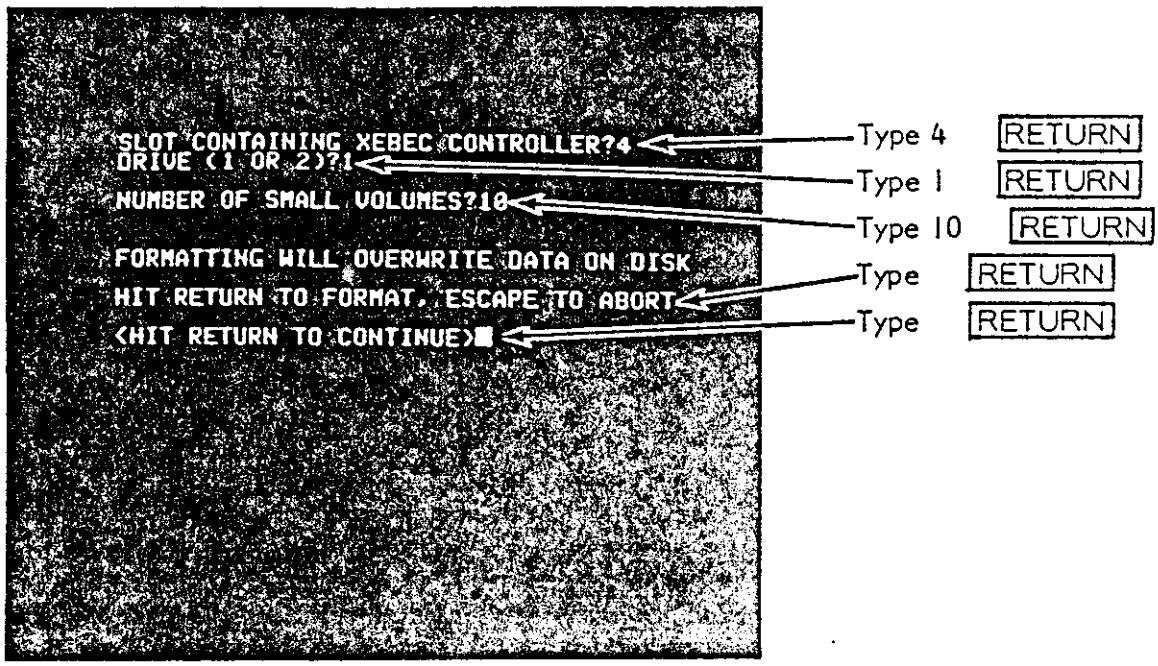
4. After Diskette "In-Use" light is out, remove the DOS 3.3 System Master diskette from drive 1 and **insert the XEBEC Kit System DOS Utility diskette.**



FORMAT THE XEBEC HARD DISK

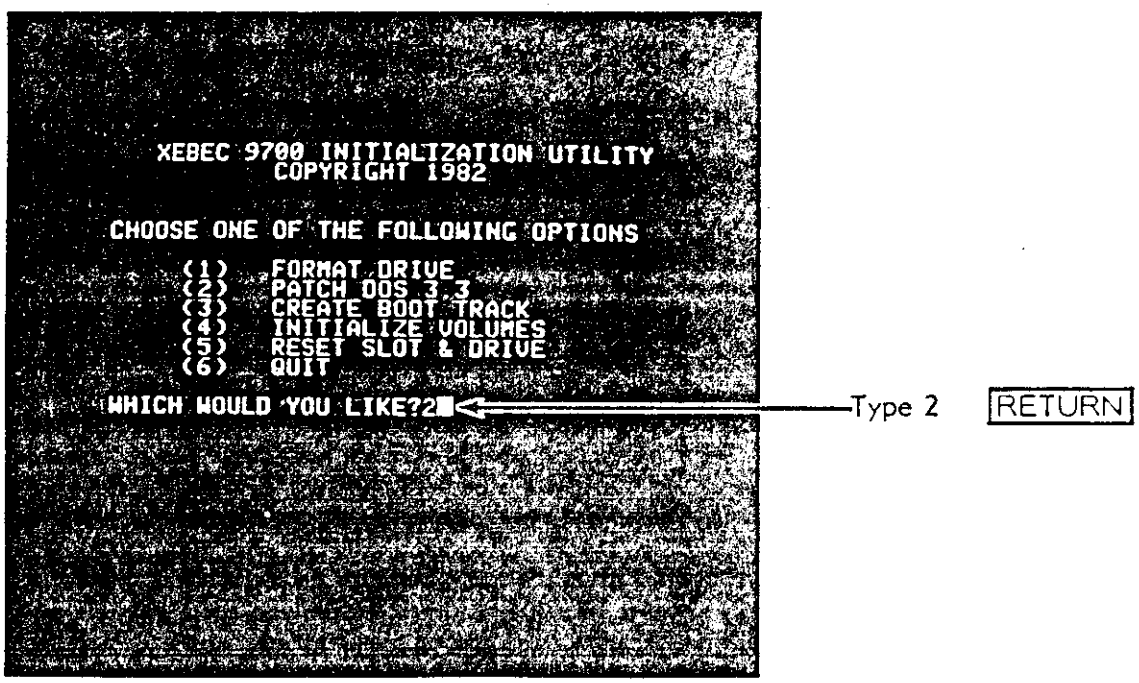


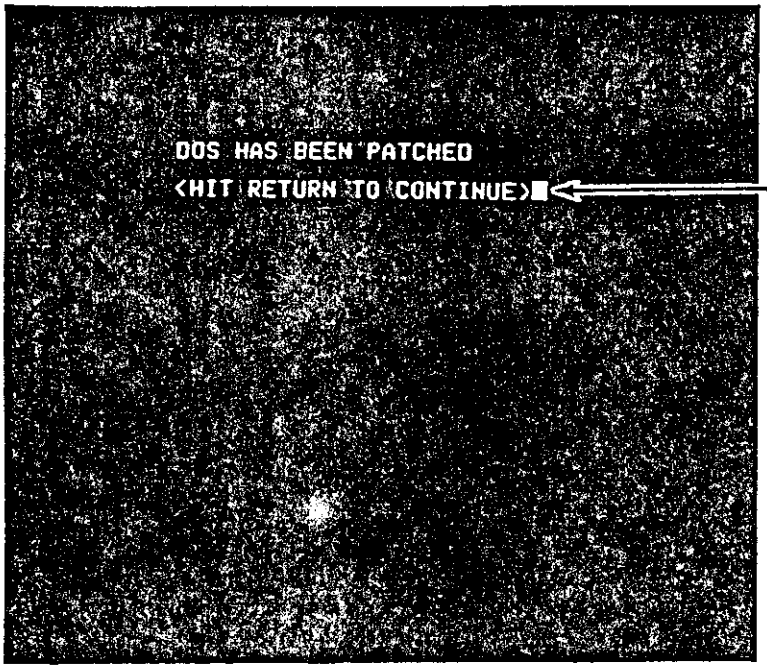
DEFINE XEBEC DRIVE CHARACTERISTICS



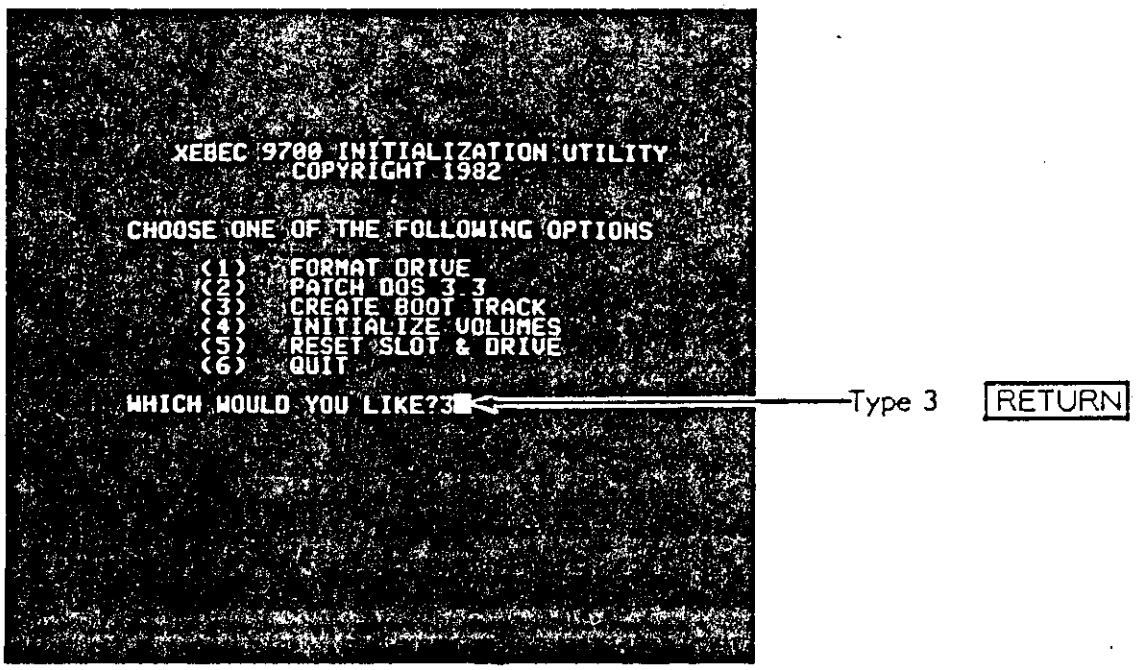
See Appendix B regarding how Xebec disk is partitioned.

PATCH DOS MONITOR TABLES



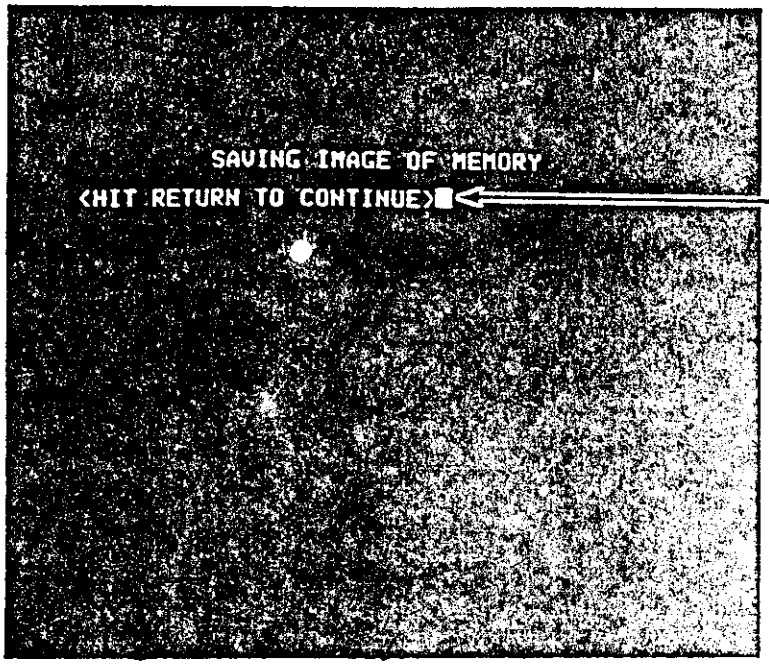


CREATE THE BOOT TRACK ON XEBEC HARD DISK

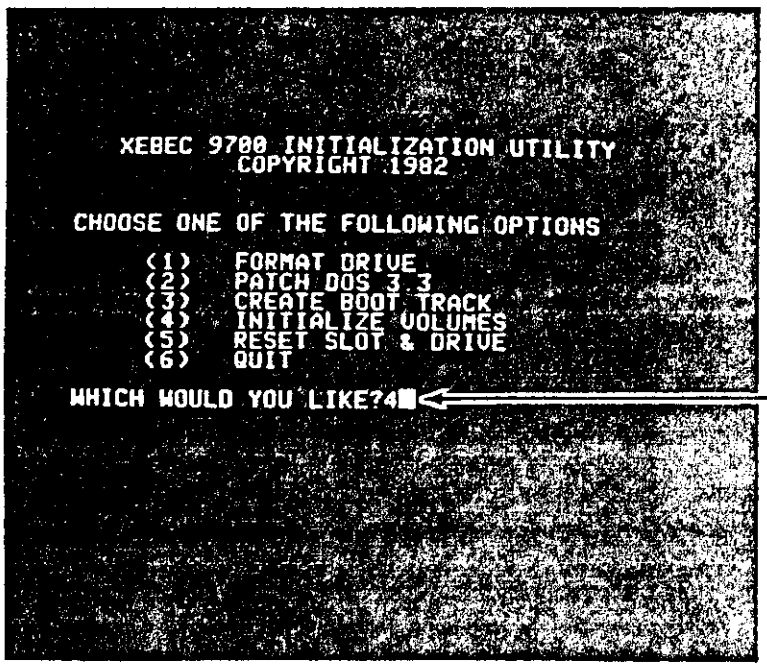


TAKE NOTICE

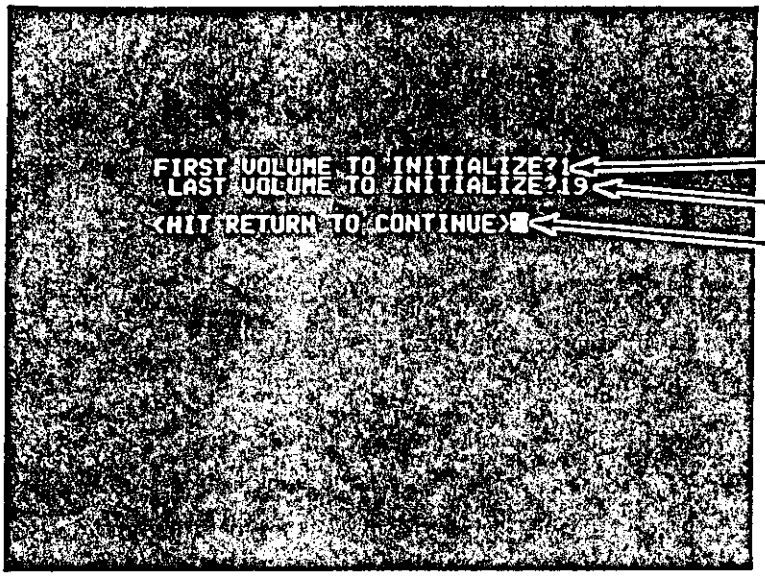
The Apple II power-on sequence boots from the first card slot where a bootable ROM is found starting from card slot 7 and moving down towards card slot 1. Therefore, if XEBEC Kit System Host Adapter is not in a card slot with a higher number than the floppy disk controller (as is the case at this point), the floppy disk will boot instead of the XEBEC Kit System. This is not anything to worry about at this point, but something you want to consider when configuring the total system for actual operation.

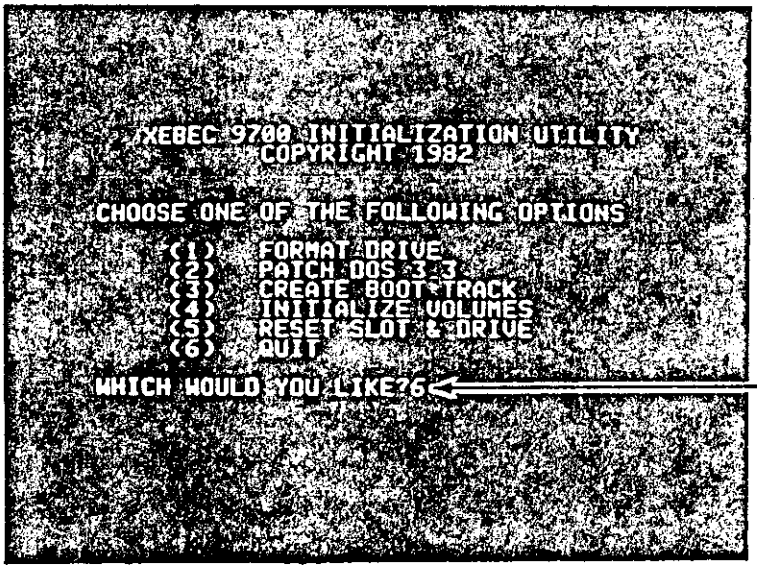


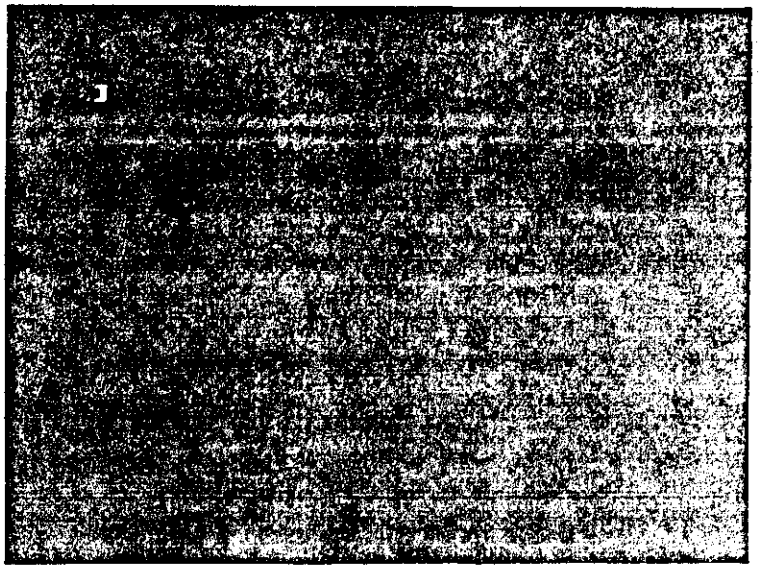
INITIALIZE XEBEC DISK DOS VOLUMES



SPECIFY VOLUMES TO INITIALIZE





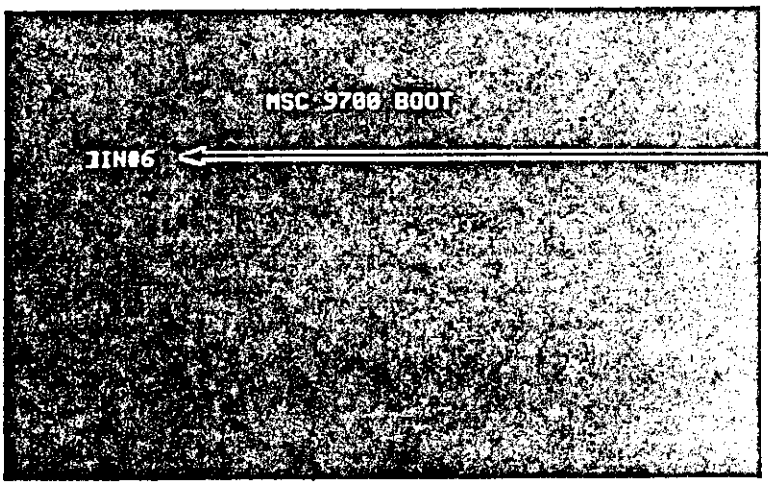


BOOT FROM XEBEC HARD DISK

Turn off the Apple II. Insert your copy of the DOS 3.3 System Master diskette into floppy drive #1. We will be booting from that floppy.

Remove the Apple Interface Card from slot 4 in the Apple and **plug it into card slot 7.** If there is a floppy disk controller card in slot 7, remove it first and move it to a lower number card slot (6 or 5).

Turn on the Apple II. The XEBEC Kit System will be booted by the power-on sequence and the CRT will display the prompt:

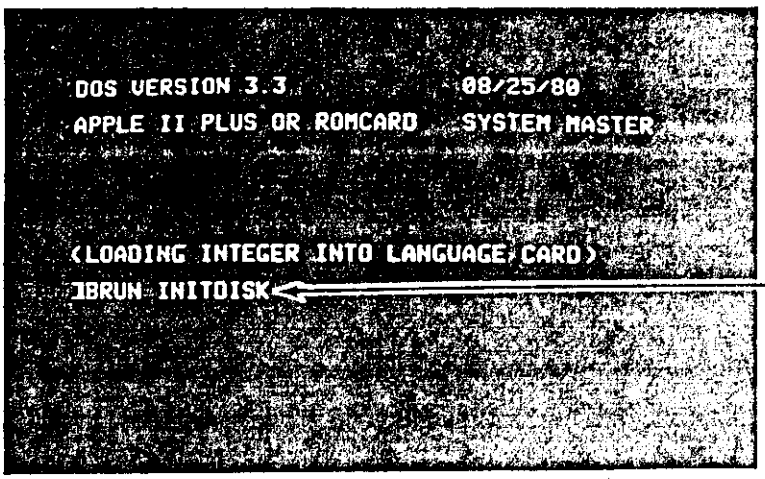


Type in #6 [RETURN]

Note: If "*" is displayed: type: 6 and hit the p-key while holding down the control key.

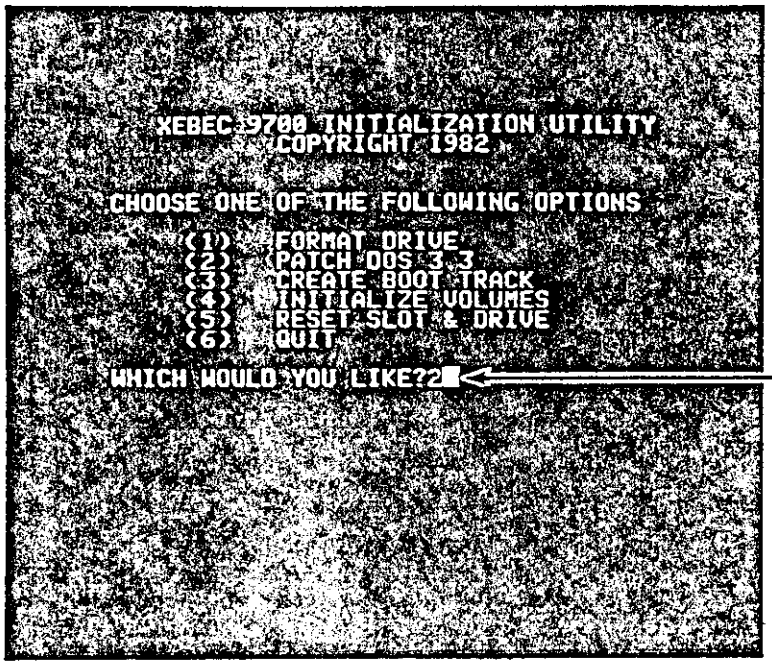
INITIALIZE HARD DISK TO USE SLOT 7

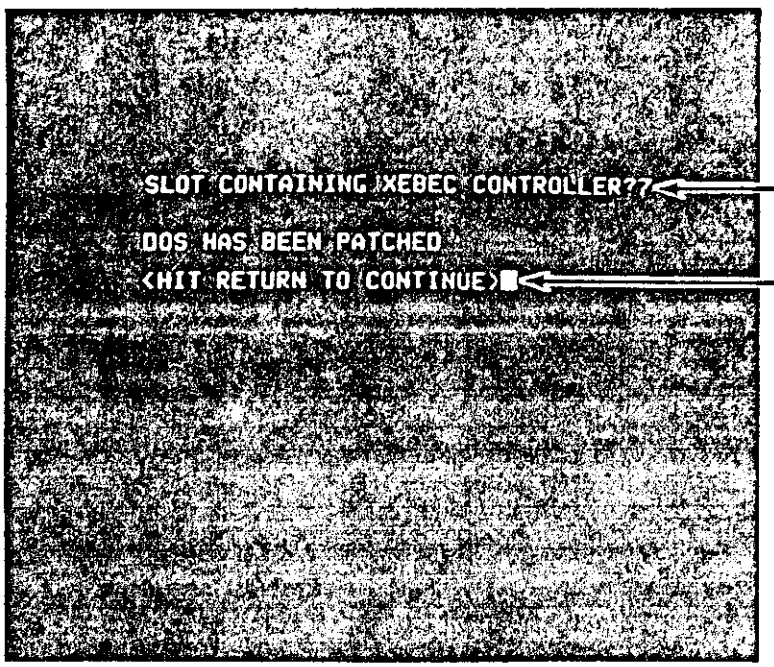
After diskette "in use" light is off, remove DOS 3.3 diskette. Insert the XEBEC DOS utility diskette, then:



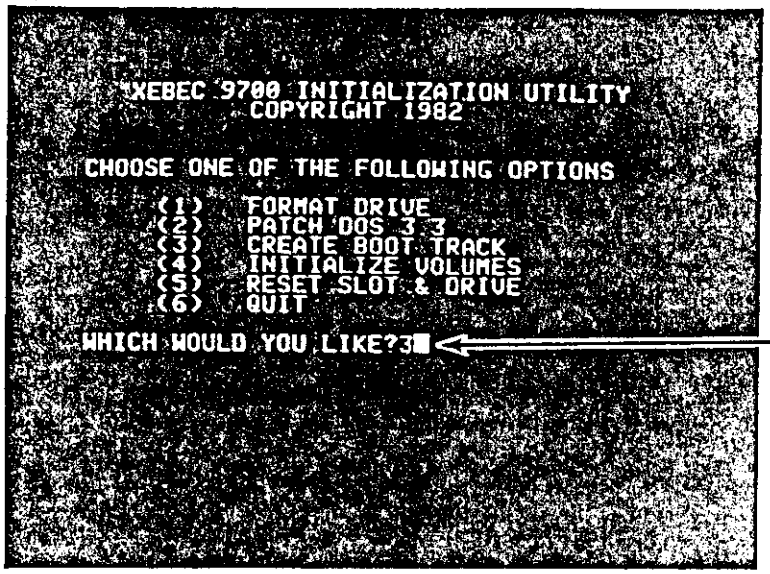
Type BRUN INITDISK [RETURN]

PATCH DOS MONITOR TABLES

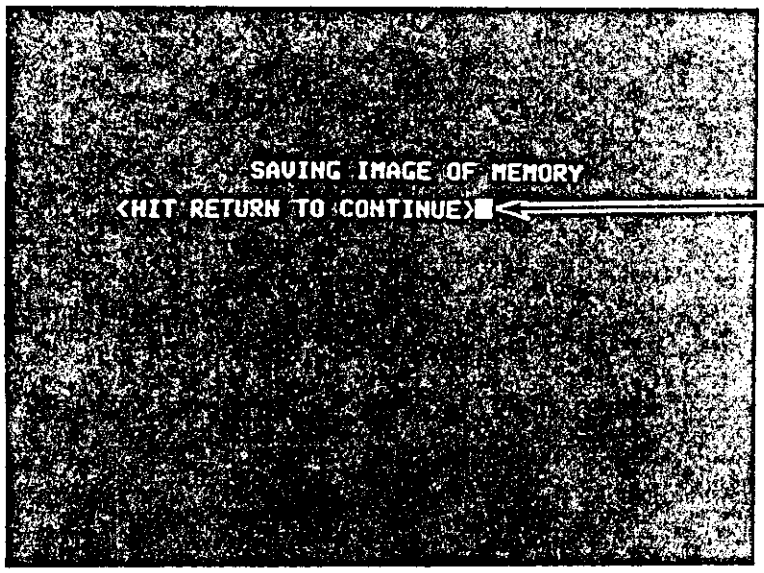




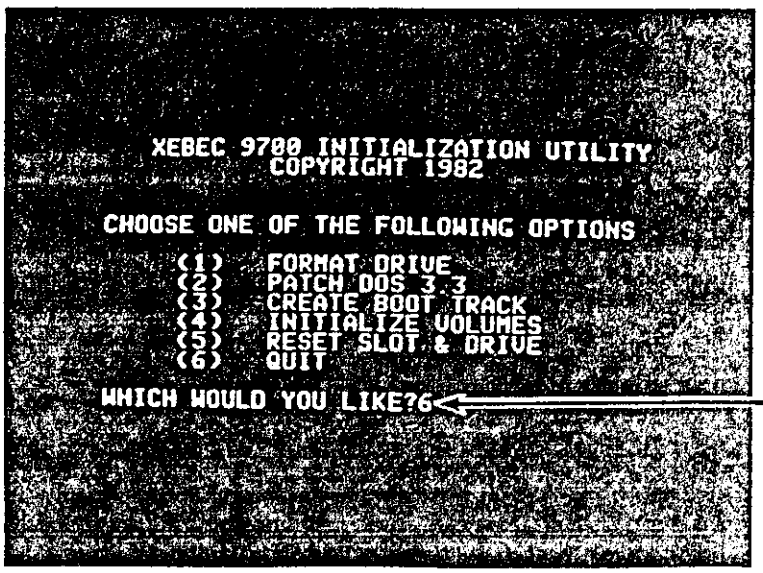
CREATE BOOT TRACK



Type 3 RETURN

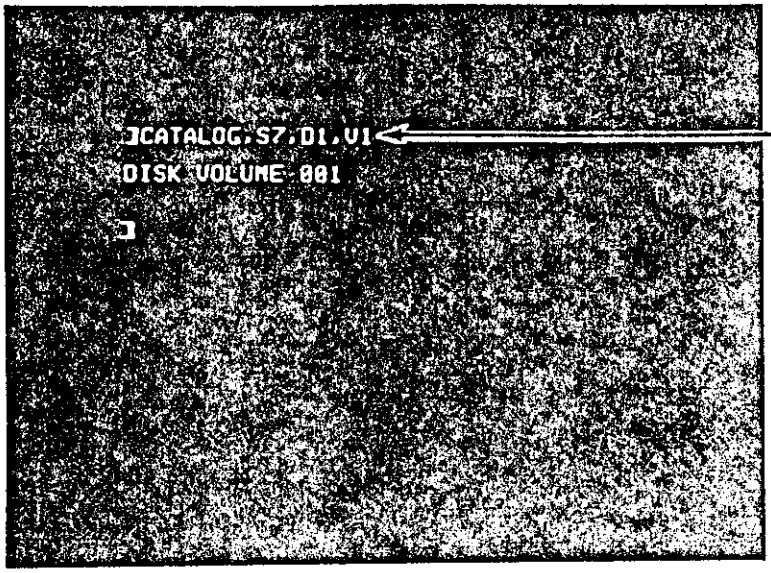


Type RETURN



Type 6 RETURN

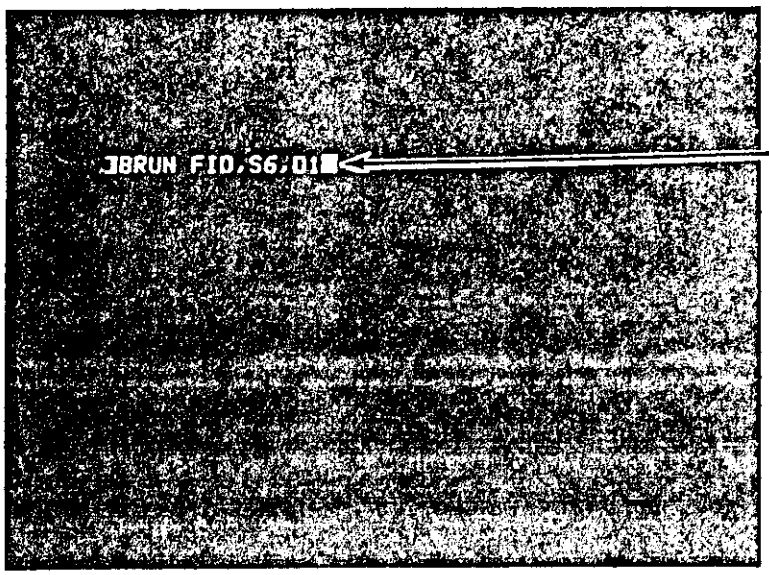
SET DEFAULT DISK LOCATION



Type CATALOG, S7, D1, V1 RETURN

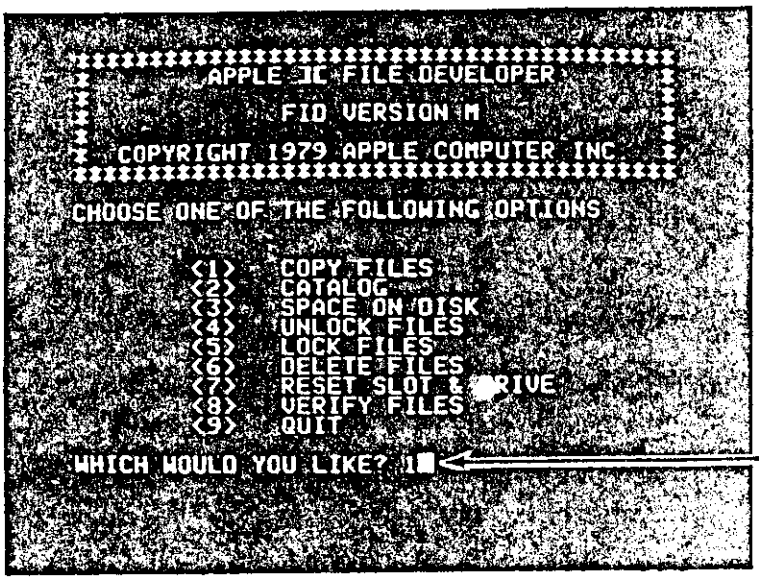
Remove XEBEC Diskette

Insert DOS 3.3 Diskette then:

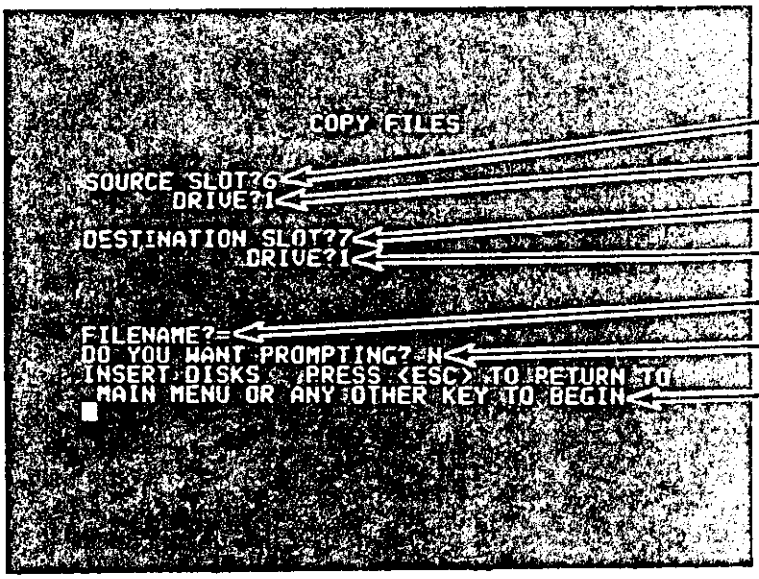


Type BRUN FID, S6, D1 RETURN

COPY DOS 3.3 SYSTEM MASTER DISKETTE ONTO VOLUME 1 OF XEBEC HARD DISK



Type 1 RETURN



Type 6 RETURN

Type 1 RETURN

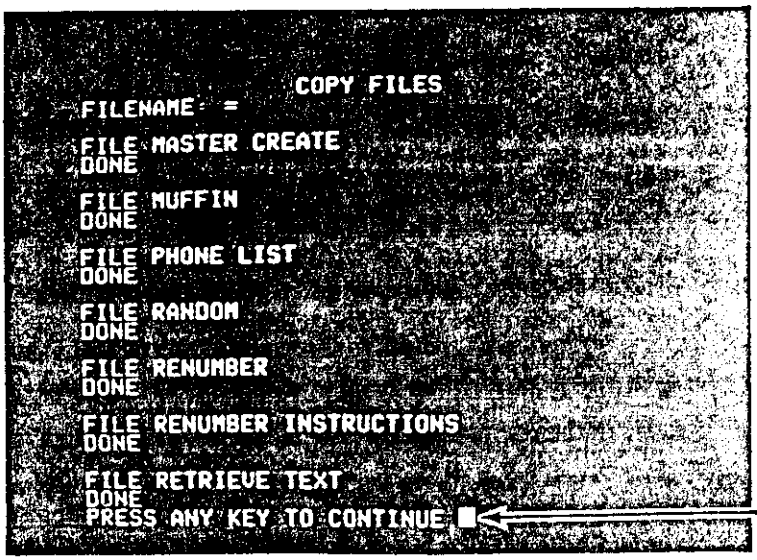
Type 7 RETURN

Type 1 RETURN

Type = RETURN

Type N RETURN

Type RETURN

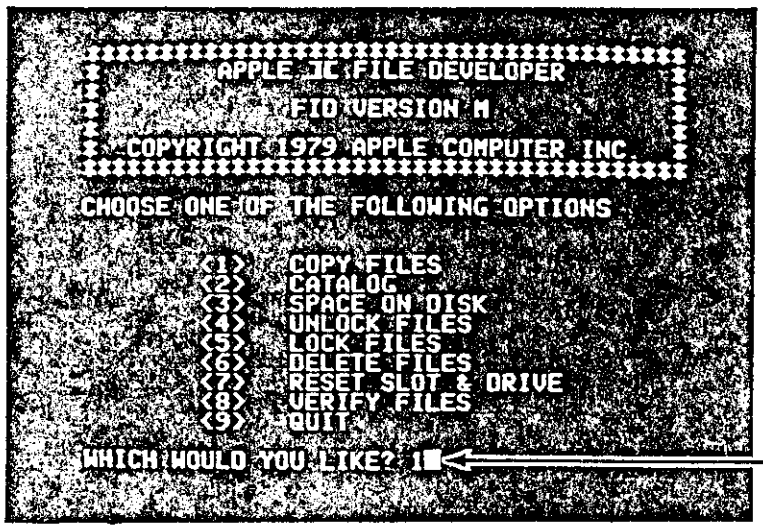


Type RETURN

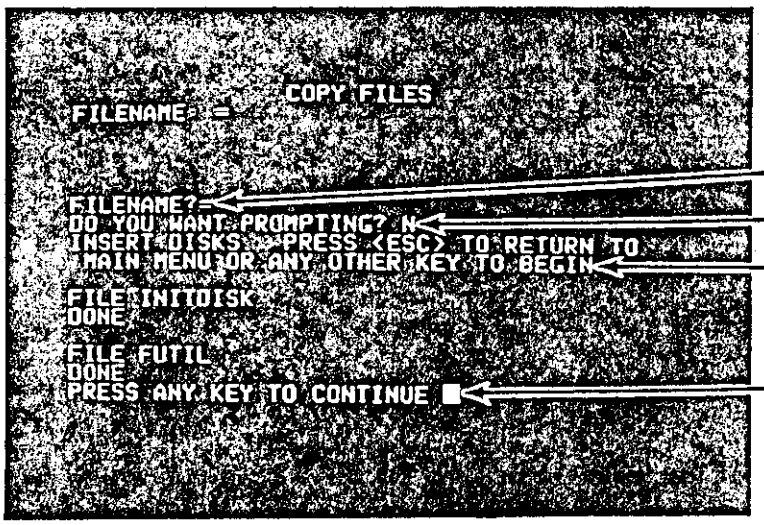
Remove DOS 3.3 Diskette

Insert Xebec Diskette then:

COPY XEBEC UTILITIES DISKETTE TO XEBEC HARD DISK



Type 1 RETURN

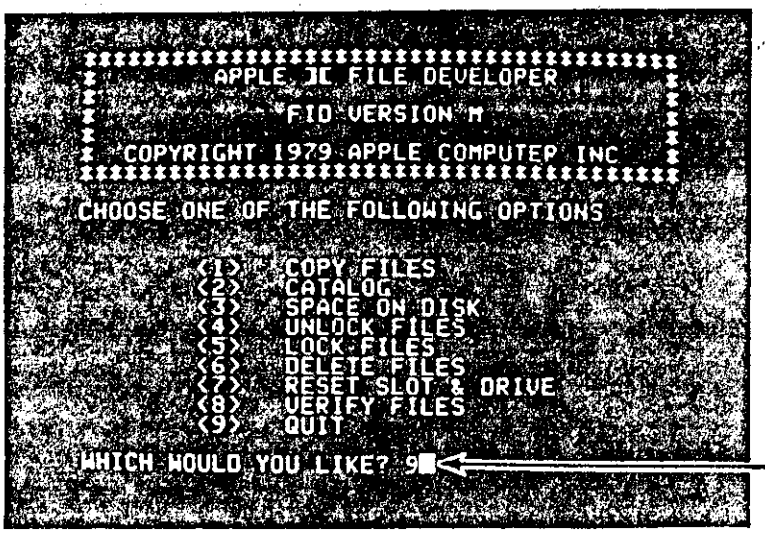


Type = RETURN

Type N RETURN

Type RETURN

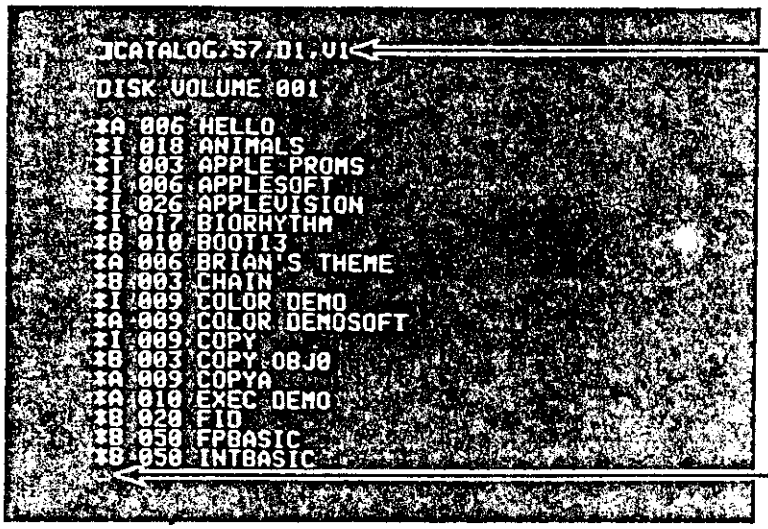
Type RETURN



Type 9 RETURN

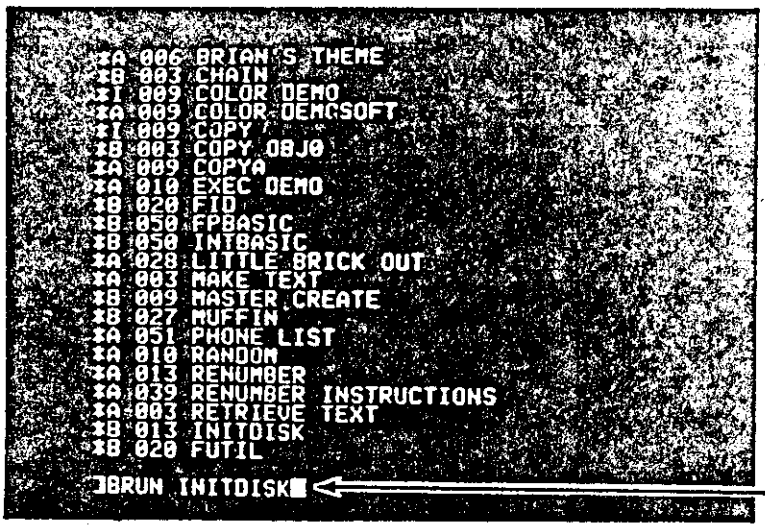
Remove Xebec Diskette and store in safe place.

SET DEFAULT TO XEBEC HARD DISK

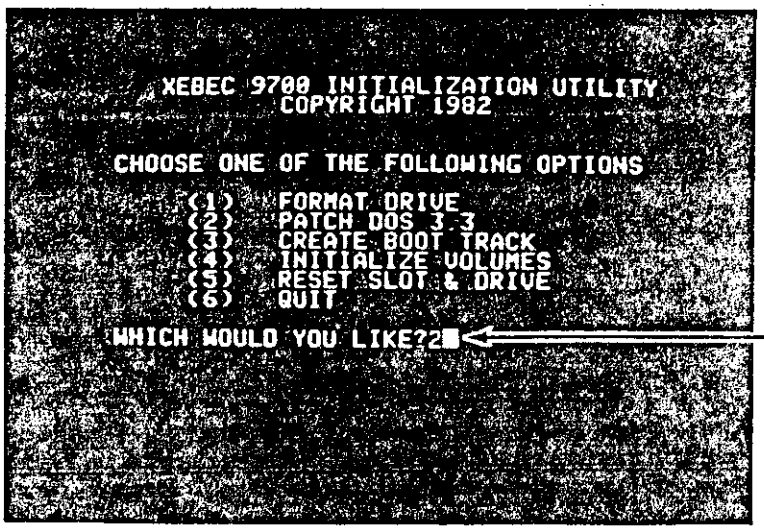


Type CATALOG, S7, D1, V1 RETURN

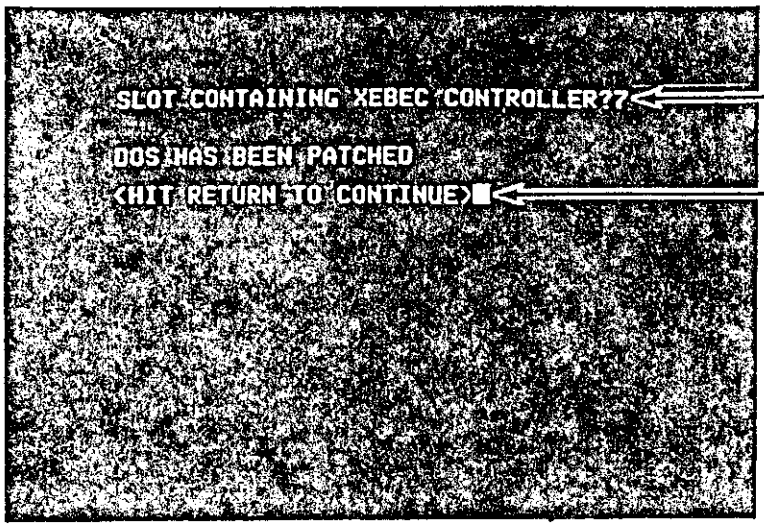
Type RETURN



Type BRUN INITDISK RETURN

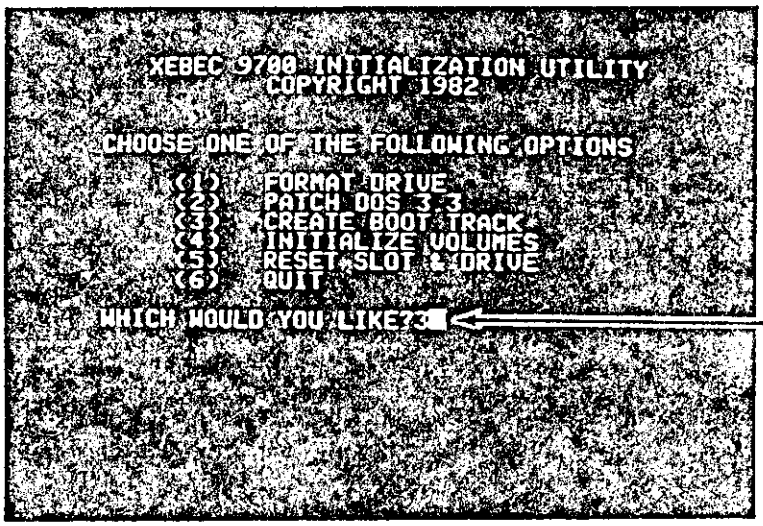


Type 2 RETURN

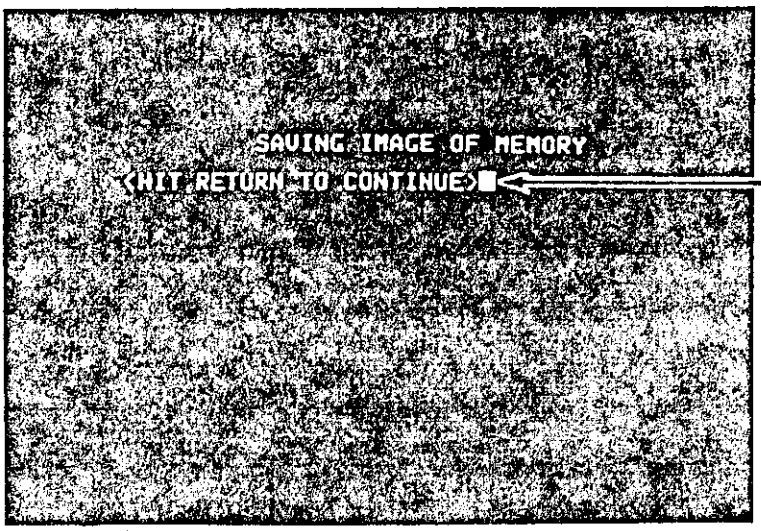


Type 7 RETURN

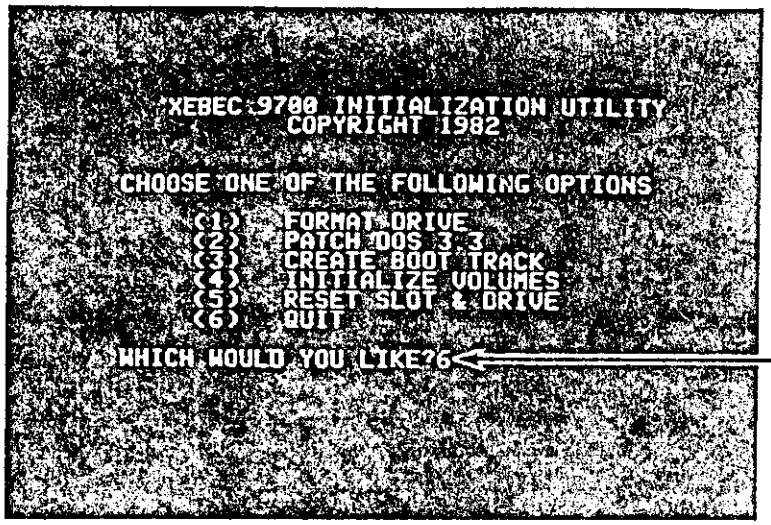
Type RETURN



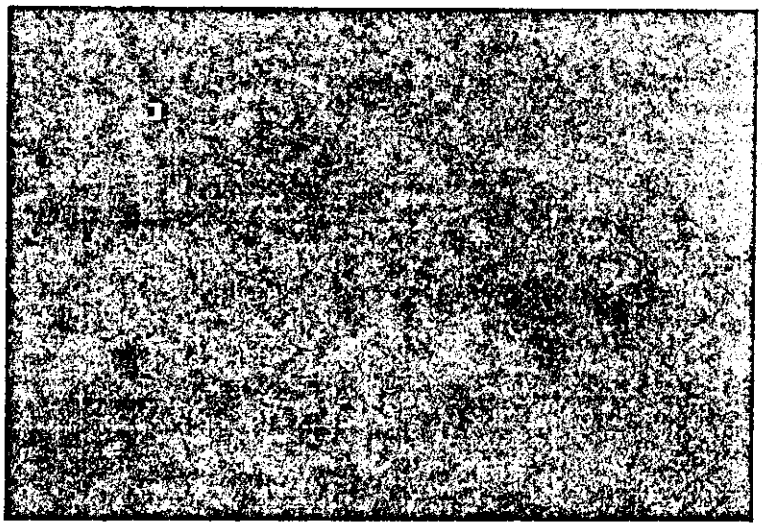
Type 3 RETURN



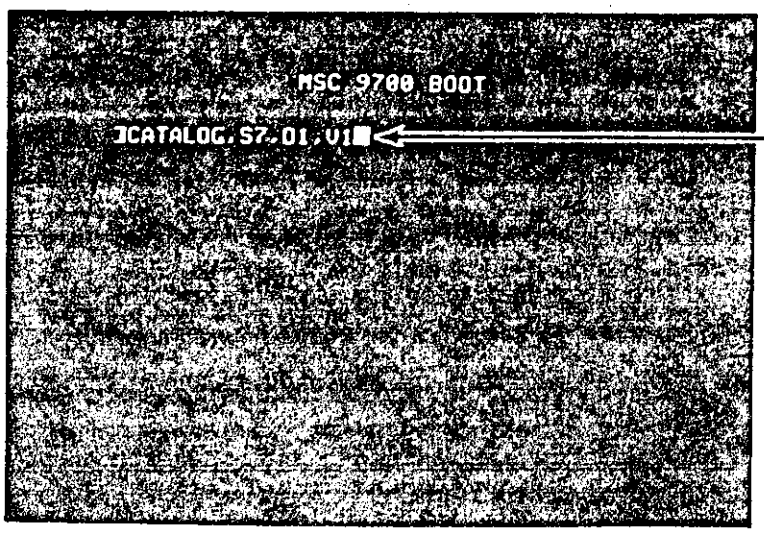
Type RETURN



Type 6 RETURN

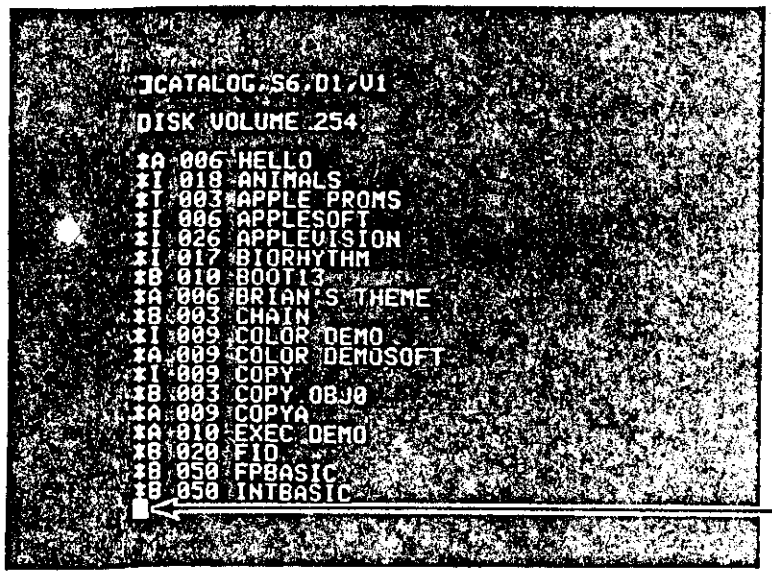


Turn Apple II power off. Leave the XEBEC Kit System on. Turn Apple II power on.

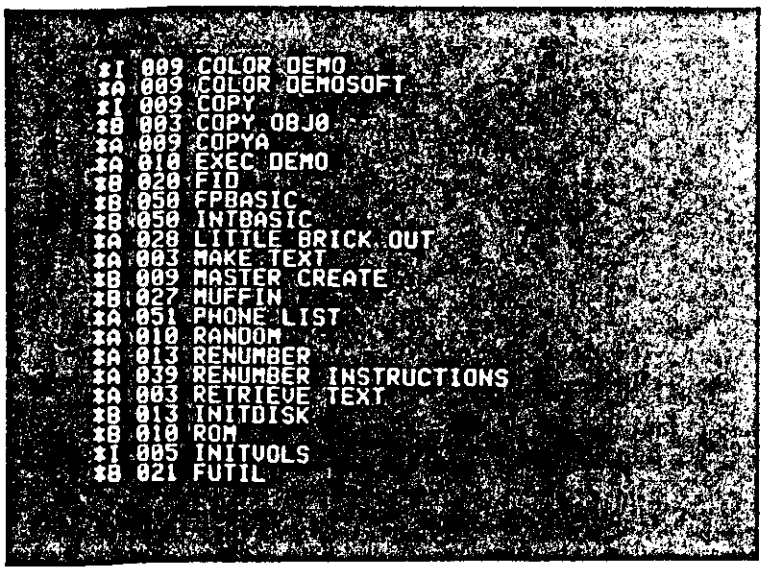


Type CATALOG, S7, D1, V1 RETURN

LIST CATALOG OF FILES



Type RETURN



YOU ARE DONE

Congratulations, you have now installed your XEBEC Kit System, made it bootable under DOS 3.3, verified that the XEBEC Kit System is working properly, formatted, and initialized the hard disks on the XEBEC Kit System.

NOTE: The following steps must be done EACH TIME the system is booted from the XEBEC Kit.

1. After boot the display will show the prompt.
2. Type FP RETURN
3. Type run hello RETURN

CHAPTER 4

OPERATION WITH PASCAL

The Pascal support software provided with your XEBEC hard disk is contained on a single floppy disk. This software is compatible with the version 1.1 release of Apple Pascal and will not function with the older release 1.0. This should not prove to be a problem since Apple abandoned version 1.0 well over a year ago (in 1980). In order to maintain complete compatibility will version 1.1 and future releases of Apple Pascal, the software fully conforms to the protocols described in the manual: "ATTACH-BIOS for Apple II Pascal 1.1" by Barry Haynes. This manual is available from the International Apple Core, the Call -A.P.P.L.E. user's group, or from your local user group.

WHAT YOU WILL NEED

In order to operate your XEBEC Kit under Pascal, you must have the following:

1. Apple II with 56K of RAM.
2. One Apple Disk II floppy disk drive and controller.
3. Apple II Pascal Version 1.1 distribution package.
4. XEBEC Pascal Utility diskette.
5. XEBEC DOS Utility diskette.
6. Apple II DOS 3.3 System Master diskette.

USING THE XEBEC UTIITY DISKETTES

XEBEC Pascal and DOS support packages must have been designed to co-reside on the same XEBEC hard disk; however, precautions must be taken so that parameters (such as operating slot and volume layout) do not conflict between the two operating systems.

If you are going to operate under DOS and Pascal you should read both Chapters 3 and 4 carefully before attempting to bring up either system.

FORMATTING THE DRIVE

While it is not necessary to have DOS implemented in order to operate under Pascal, the disk must be formatted by the XEBEC DOS Utility, **INITDISK.**

Use of **INITDISK** is explained in Chapter 3 in the section, **BRINGING UP THE SYSTEM.** If you are not going to bring up DOS, then only the format function need be executed before continuing to the next Pascal section. Otherwise, you must bring up DOS first, with attention to necessary modification of default parameters.

BRINGING UP PASCAL

As per the Attach mechanism in Apple Pascal, foreign devices are incorporated by the inclusion of three files on a boot diskette: SYSTEM.ATTACH, ATTACH.DRIVERS, and ATTACH.DATA.

SYSTEM.ATTACH is a compiled Pascal program that is executed whenever the system is booted up (even before SYSTEM.STARTUP is executed). It reads the ATTACH.DATA file that contains information about the types of drivers that are to be loaded. With this information in hand the ATTACH.DRIVERS file is read in. The ATTACH.DRIVERS file contains the actual drivers for user defined devices.

These three files are provided on the XEBEC Pascal diskette. By including them on your boot diskette Apple Pascal will recognize the hard disk if you have the controller card in slot five (if there isn't a XEBEC controller card in slot five the

system may hang). Additional instructions concerning the use of this file will be presented later.

To prevent conflicts from occurring with DOS, Pascal files physically occupy the last available sectors on the disk surface. The Pascal software automatically divides the allocated space into two volumes (using the pairs 4,5; 9,10; or 11,12). To allocate space for Pascal you simply decide how many DOS volumes you wish the Pascal volumes to consume and modify the Pascal driver software accordingly. For example, the SYSTEM.ATTACH, ATTACH.DRIVERS, and ATTACH.DATA files provided on the disk assume that DOS volumes 30..34 are reserved for Pascal. **Since these volumes are reserved for Pascal you must not attempt to save a DOS program to any of these volumes or you will certainly crash the Pascal software.** Unfortunately this precaution must be taken by the user, the DOS software will happily write to volumes 30..34 without hesitation. If you wish to reserve more or less space for Pascal you will need to reassemble the ATTACH.DRIVERS text file. Techniques for doing so will be described in a later section.

Every DOS volume except volume #34 contains 560 sectors of information. Volume number 34 only has 544 sectors of information. Therefore, the default drivers reserve 2784 sectors of storage for use by Pascal. This number is found using the formula:

NUMSECS=(560*(34-VOLSTRT))+544

where VOLSTRT is the first volume reserved for Pascal (in this case 30). Since Pascal uses 512-byte blocks and DOS uses 245-byte sectors you must divide the number of sectors obtained in the previous calculation by two in order to obtain the number of Pascal blocks reserved. So the default number of blocks reserved is 1392 512-byte blocks. Finally, the space is evenly divided between the two Pascal volumes so this number must be divided by two again in order to obtain the number of blocks reserved per volume. The equation used to determine the number of blocks reserved for each volume is:

NUMBLKS+((560*(34-VOLSTRT))+544)/4

So the default ATTACH files reserve 696 blocks for each volume defined in the system.

With this information in mind you can use the ATTACH files provided to get your hard disk subsystem up and running under Apple Pascal. In order to utilize these files you must install your Xebec controller in slot #5 of your Apple Computer (follow the installation instructions provided with the Xebec hard disk system). The default ATTACH files require that the controller be installed in slot #5, although this can be changed if necessary. Next, copy the SYSTEM.ATTACH, ATTACH.DATA, and ATTACH.DRIVERS files to a copy of your APPLE1: (or equivalent) diskette. Power up your hard disk and boot the system. Note that during the boot process there is some extra disk access after the sign-on logo is printed and before control is given to the keyboard. If you get to this point, great. If not, check and make sure your controller card is installed in slot #5.

Although you have booted the system up, you still cannot use the hard disk until the directories are fixed up. In order to prepare the Pascal directories on the hard disk you must first enter the filer mode by pressing an "F" at the command level. In order to prepare as directory you must type "Z" (for zero). This command "zeroes" the directory, clearing all entries and brings the volume on-line. After pressing "Z", the filer will ask you which volume you wish to zero. Respond with "#9:" (note: do not include the quotes). The filer will then ask you if you want a duplicate directory, you should answer "N" unless you have a compelling need to maintain two directories on the disk. Next the filer will ask you how many blocks there are on this "diskette". Answer 696 as per the previous discussion. The filer will now ask you for a volume name. You should respond with "HARD1:". After some disk access the filer will ask you to verify this name and you should answer "Y". At this point the volume will be zeroed and ready for use. Repeat this process for unit #10: except you should name it "HARD2:" instead of "HARD1:". While you may use any valid Pascal volume name in place of HARD1: and HARD2:, the remainder of this document will assume that you are using these names.

Once you have zeroed the directories you should transfer the data on your APPLE1: and APPLE2: diskettes to the HARD1: volume. This is accomplished using the filer commands:

```
T(ransfer)      APPLE1:=,HARD1:$
T               APPLE2:=,HARD1:$
```

You might also transfer the data on your APPLE3: diskette to the HARD2: volume using the command:

T (ransfer) APPLE3:=,HARD2:$

Modifying the ATTACH.DRIVERS File for Different Requirements

There are four reasons why someone would want to modify the ATTACH.DRIVERS file.

1) The user wishes to change the slot number of the controller card.

2) The user wishes to change the unit number of the two volumes on the Xebec disk.

3) The user wishes to allocate more or less storage for the Pascal system on the hard disk.

4) The user needs to attach other drivers to the system in addition to the Xebec disk driver.

Points two, three, and four are easily taken care of so they will be discussed first.

In order to modify the slot number, unitnumber, or amount of space reserved you must load the "S1410.TEXT" file into the editor and change one of the appropriate lines at the beginning of the file. More specifically, there are three lines of the form:

```
SLOT      .EQU    5.
VOLSTRT   .EQU    30.
UNITNUM   .EQU    9.
```

(particularly note the period after the decimal numbers.)

In order to change the slot number of the controller card simply change the number "5." after the SLOT label to the slot number you wish to place the controller card in.

For example, if you wish to palce the controller card in slot seven then you should change the first equate to:

```
SLOT.EQU    7.
```

If you wish to refer to the hard disk as some volume other than #9: and #10: you should change the equate

```
UNITNUM     .EQU      9.
```

to either

```
UNITNUM     .EQU      4.
```

or

```
UNITNUM     .EQU      11.
```

These two equates let you refer to the hard disk as units 4 & 5 or 11 & 12 respectively. There are a couple of problems in referring to the hard disk as units 4 and 5, these problems and their solution will be discussed later.

The VOLSTRT equate lets you define the amount of storage allocated to the Pascal system on the hard disk. This equate assumes that you have divided your disk into 34 volumes under the control of DOS 3.3. VOLSTRT defines the first volume to be allocated to Pascal. From VOLSTRT through volume #34 will be allocated to the hard disk under Pascal. The exact amount of storage reserved is described by the formula mentioned earlier in this document, but the following table may help you decide which value to pick.

IF VOLSTRT IS:	Then each volume has:	
33	276 blocks	(138K)
32	416 blocks	(208K)
31	556 blocks	(278K)
30	696 blocks	(348K)
29	836 blocks	(418K)
28	976 blocks	(488K)
27	1116 blocks	(558K)
26	1256 blocks	(628K)
25	1396 blocks	(698K)
24	1536 blocks	(768K)
23	1676 blocks	(838K)
22	1816 blocks	(908K)
21	1956 blocks	(978K)
20	2096 blocks	(1.05M)

It is recommended that VOLSTRT range between 20 and 30.

These three lines are the only ones that should be changed in the S1410.TEXT file (and, in fact, **they should only be made to a copy of the file not the original program).** Once you have made these modifications in the editor you should quit the editor (updating the work file) and assemble the file using the "A" command at the command level. Once the file is assembled you should enter the filer and save it under a some name other than S1410 (such as MYDRIVER).

In order to incorporate your newly assembled program into the attach boot-up sequence you must run the LIBRARY program found on the APPLE3: disk. When it asks you for an output file name type "ATTACH.DRIVERS". When it asks you for an input link code file type the name of the file you just assembled and saved (the codefile name, not the textfile name). Then type a one followed by a space, followed by a zero followed by return. This copies the MSC-9700 file from slot one of the input file to slot zero of the output file. Hit QUIT and then RETURN to exit the LIBRARY program and save the new ATTACH.DRIVERS program to disk.

Replace the ATTACH.DRIVERS program on your boot disk with this new ATTACH.DRIVERS program and your system will boot up using the new defaults you assigned to the system. Note that if you changed the VOLSTRT equate in the assembly language program you must zero the hard disk directories before you proceed. Because you must lose everything on the hard disk every time you change the size of the volume it is recommended that you pick a size and stick to it.

Assigning the Xebec Disk to Volumes #4: and #5:

As it was previously noted there are some difficulties associated with assigning the hard disk to volumes #4: and #5:. Specifically, #4: is the boot volume. And as per

Apple Computer conventions you must always boot from a floppy disk in slot #6. When you assign the hard disk to unit number four the following process occurs during a boot:

1) The system boots up from slot six and recognizes the disk in slot six, driver one as the root volume.

2) The disk in slot six, drive two is check to find out what files are present.

3) The SYSTEM.ATTACH file is executed and now the system thinks that the hard disk is the disk you booted from.

At this point everything would be fine except that the name of the hard disk volume #4: must exactly match the name of the floppy disk you booted from or the system will hang. This is a simple problem to fix; simply name your boot disk HARD1. You may want to create a disk specifically for booting the hard disk and place only the SYSTEM.APPLE, SYSTEM.PASCAL, SYSTEM.LIBRARY, SYSTEM.ATTACH, ATTACH.DATA, and ATTACH.DRIVERS files on it. Once the system has booted you should remove the floppy diskette you booted on from the drive so that the Pascal system doesn't get confused later on. When you setup the hard disk as units #4: and #5: the floppy disks in slot six respond to units #9: and #10:.

Attaching Additional Devices to the ATTACH.DRIVERS File

Since several manufacturers use the SYSTEM.ATTACH protocol to make their peripherals work with Apple Pascal there is the possibility of a conflict occurring

since only one ATTACH.DRIVERS file may exist on the disk. In order to combine DRIVER files you must use the LIBRARY program as mentioned earlier. Furthermore you must use the ATTACHUD.CODE program to create a new ATTACH.DATA file. The documentation provided by the International Apple Core for the ATTACH-BIOS concerning this application is provided on the disk.

APPENDIX A
SPECIFICATIONS

The following specifications on the XEBEC Kit System are furnished for information purposes only. XEBEC reserves the right to change any specification, without prior notice, in order to improve or enhance the operation and/or appearance of the XEBEC Kit System.

Average Access Time (within a volume):	170 milliseconds
Volume per drive:	1
Cylinders per drive:	153
Heads per drive:	4
Sectors/Track:	32
Bytes/Sector:	256
Total Formatted Capacity (per drive):	5.0 Megabytes
Recording Format:	MFM
Rotational Speed (±1%):	3600 RPM

AC POWER REQUIREMENTS FOR XEBEC SUPPLIED POWER SUPPLY:

Source (±10%):	100-120 VAC
Line Frequency (±2%):	60 Hz
Power Consumption:	120W

DC POWER REQUIREMENTS:

A User-Supplied DC Power Supply must have the following characteristics to ensure proper XEBEC Kit operation.

Use of a Power Supply which does not meet these specifications may void the warranty for the XEBEC Kit.

OUTPUT:

Volts DC		Current
+5	±5%	4.5A
+12	±5%	2.0A steady
	±10%	4.5A surge 15 sec. on power on

LINE REGULATION:

±.3% for 20% line change.

NOISE AND RIPPLE:

10mv peak to peak

TRANSIENT RESPONSE:

Less than 50 microseconds for 50% load change.

OPERATING TEMPERATURE:

0°C to 50°C full rated.

TEMPERATURE COEFFICIENT:

±.02%/°C

STABILITY:

±.3% maximum for 24 hours after warmup.

VIBRATION:

Per Mil-Std 810C Method 514 Procedure X

SHOCK:

Per Mil-Std 810C Method 514 Procedure V

OVERVOLTAGE PROTECTION:

On +5V output.

SHORT CIRCUIT PROTECTION:

Current limit all outputs.

PHYSICAL DIMENSIONS:

Height:	6.375 in. (16.1925 cm)
Width:	10.5 in. (26.67 cm)
Depth:	12 in. (30.48 cm)
Net Weight:	20 lbs. (9.072 kg)

ENVIRONMENTAL RANGE:

Operating Temperature:	50°F to 104°F (10°C to 40°C)
Storage Temperature:	-19°F to 140°F (-40°C to 60°C)
Relative Humidity:	20% to 80% (without condensation)

APPENDIX B
XEBEC HARD DISK FORMATTING FOR DOS

Formatting destroys ANY and ALL data on the specified hard disks. **Formatting need be done, at most once (EVER).** However, should a hard disk DOS file directory become completely unusable (re-)formatting is one's LAST recourse.

There can be **1 to 34 nominal-floppy equivalents** at the front of the hard disk. Any **remaining space** on the hard-disk is allocated, as far as it will go, into virtual floppy disks that are **each 4 times the size** of the nominal-floppy image.

Note that the nominal-floppies are the **equivalent** of 35 tracks of 256-byte sectors. To make more hard-disk space available to the user the 3 tracks of system area, (normally found at the front of real Apple 16 sector floppies) has been made directly available as file space to the user. The 4K virtual floppies also are entirely available for user files. A side effect is that one cannot boot from any of the virtual floppies. The real hard disk boot-block and system area preponds all of the virtual floppy areas.

Note, therefore, that each and every virtual floppy on the XEBEC Hard Disk may hold more data than can be backed up on a single real 16-sector floppy.

A suggested way to allocate the hard disk is :

Virtual Vol #	Allocation Swatch	Size
1 - 10	1 - 10	1X
11	11 - 14	4X
12	15 - 18	4X
13	19 - 22	4X
14	23 - 26	4X
15	27 - 30	4X
16	31 - 34	4X

The actual number of small-volumes selected depends upon the application and preferences of the user. The number 10 is suggested as a reasonable compromise between number and size of the various volumes.

APPENDIX C
WHAT TO DO IF YOU HAVE TROUBLE

In the unlikely event you should have trouble with your XEBEC Kit System, read the following table, find the symptom that best describes the problem and then check the POSSIBLE CAUSE/SOLUTION column for action you should take.

Table C-1. Problem-Cause/Solution

SYMPTOM	POSSIBLE CAUSE/SOLUTION	REFERENCE
Disk Drive Does Not Run - Fan not running - No hum/whirling sound - Red light never illuminates	Possible Causes 1. AC power cord unplugged 2. Power to AC wall outlet off Solutions 1. Check AC power cord at wall outlet and back of XEBEC Kit System 2. Check AC wall outlet for voltage. If no AC power, check wall outlet circuit breaker.	
AC Power To XEBEC Kit System But Apple II (Cannot Talk to (or Receive Data From) The XEBEC Kit System	Possible Causes 1. Ribbon Cable not plugged into XEBEC Kit System or Personality Card in Apple II. 2. Ribbon cable connector plugged into Personality Card upside down. 3. Personality Card has become unplugged in Apple II. 4. Ribbon cable connector plugged in right-side-up but pins are aligned wrong (i.e., not every male pin is plugged into a mating female receptacle). 5. Personality Card is not plugged into card slot number 4 in the Apple II.	

SYMPTOM	POSSIBLE CAUSE/SOLUTION Solutions	REFERENCE
	1. Check back of XEBEC Kit System to be certain that the ribbon cable is plugged in. Unplug AC power cord from Apple II.	Figure 8
	Remove Apple II cover and check that Personality Card ribbon cable connector is still plugged in.	Figure 10
	2. With cover removed from Apple II, check that the ribbon cable connector is plugged into the Personality Card properly. If the connector was plugged in upside down, you are fortunate. The XEBEC Kit System has been designed so that reversal of this connector will not harm the Personality Card or the XEBEC Kit System; it will just keep the XEBEC Kit System from working properly.	Figure 8
	3. With cover removed from the Apple II, gently push down on the Personality Card to ensure that it is seated properly in card slot number 4.	Figure 9

SYMPTOM	POSSIBLE CAUSE/SOLUTION	REFERENCE
	4. With cover removed from the Apple II, look closely at the ribbon cable connector and corresponding male pin connector. If all pins are not aligned properly, unplug and replug in the ribbon cable connector. If the connectors were misaligned, you may not be so fortunate as with the connector plugged in upside down. Misalignment of these connectors can possibly cause severe damage to the Personality Card and/or the disk drive. All you can do at this point is plug the connectors in properly and try the XEBEC Kit System again. We hope everything will work out all right. If not, you'll have to contact your dealer for service.	

APPENDIX D
LIMITED 90-DAY WARRANTY

WHAT WE DO

In the U.S.A. and Canada, the XEBEC Kit is warranted by XEBEC Systems, Inc. against defects in materials and workmanship for 90 days from date of original purchase. If you sell your XEBEC Kit or otherwise transfer its ownership, the warranty is automatically transferred to the new owner and remains in effect for the original 90 day period. During the warranty period we will repair or, at our option, replace at no charge the XEBEC Kit and/or accessories that prove to be defective, provided it is returned, shipping prepaid, to XEBEC Systems, Inc., 432 Lakeside Drive, Sunnyvale, CA 94086, or an authorized XEBEC repair facility. You are responsible for all customs duties in connection with the return of the XEBEC Kit.

WHAT IS NOT COVERED

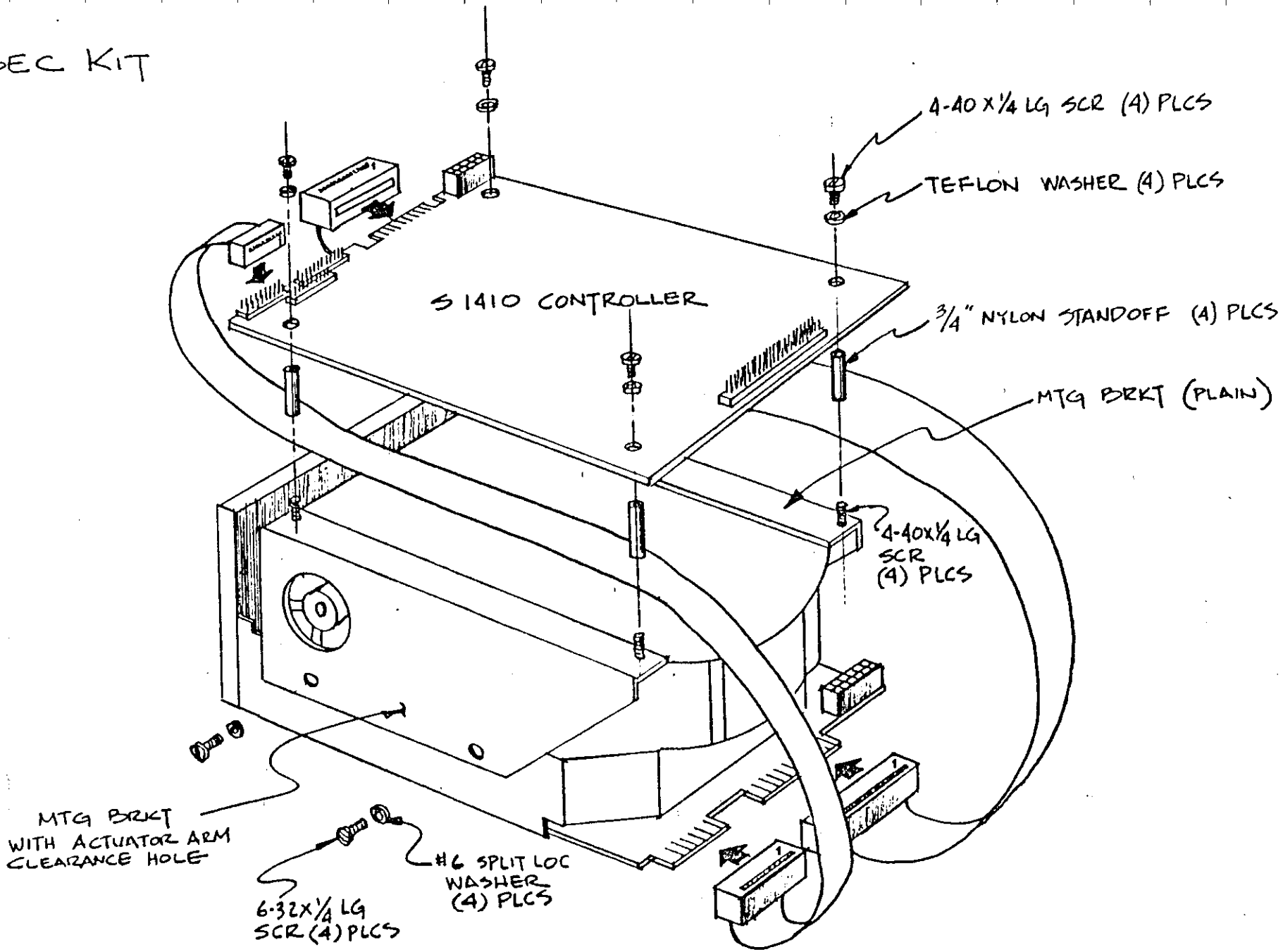
The warranty does not apply if the product has been damaged by accident or misuse, or as a result of service or modification by other than an authorized XEBEC repair facility. XEBEC Systems, Inc. shall have no obligation to modify or update products once manufactured. This warranty is deemed to be voided if the factory sealed enclosures containing, but not limited to, disks and heads, have been opened or shows evidence of an attempt to be opened. XEBEC Systems, Inc. shall for no purpose be deemed to have any liability with respect to the loss of data.

No other express warranty is given. The repair or replacement of a product is your exclusive remedy. ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS IS LIMITED TO THE 90 DAY DURATION OF THIS WRITTEN WARRANTY. Some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you. IN NO EVENT SHALL XEBEC SYSTEMS, INC. BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state or province to province.

THIS IS YOUR WARRANTY: PLEASE RETAIN FOR YOUR RECORDS.

XEBEC KIT


4-40 X 1/4 LG SCR (4) PLCS
TEFLON WASHER (4) PLCS
S 1410 CONTROLLER
3/4" NYLON STANDOFF (4) PLCS
MTG BRKT (PLAIN)
4-40X1/4 LG SCR (4) PLCS
MTG BRKT WITH ACTUATOR ARM CLEARANCE HOLE
#6 SPLIT LOC WASHER (4) PLCS
6-32X1/4 LG SCR (4) PLCS

MTG DETAIL
S-1410 TO 5¼" DISK DRIVE
100648